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UK METEOROLOGICAL OFFICE
GLOBAL DATA MONITORING REPORT

July 2003

Data Assimilation
Meteorological Office
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1. Introduction

As the WMO-appointed lead centre for monitoring surface marine data, the U.K. Meteorological Office produces monthly statistics on the quality of these observations received at RSMC Bracknell. This report includes this information along with statistics for most other types of data. The figures and tables contained herein are presented according to the agreed standards for the exchange of monitoring results.

The report is based on data received at the UK Meteorological Office Headquarters, Bracknell in time for inclusion into the appropriate analysis (the current cut-off time is approximately 7.2 hours after each analysis time). The evaluation of data quality is based on comparison with the appropriate 6-hour global model forecast (background) field, although to provide background values valid at the observation time for non-main hour data, time-interpolation of the T+3, T+6 and T+9 forecasts is used; and for sea surface temperature the background field is the analysis from the previous day. Generally, the background field is of high quality except in data sparse areas, tropical regions and areas close to steep orography where care should be taken in interpreting the statistics shown.

Comments or queries on the report are welcome and should be addressed to:-

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2 Global Data Monitoring Statistics

Ships, Fixed buoys, Platforms and Drifting buoys observations

TABLES 1and 2 contain lists of the stations which are considered to have returned suspect observations of pressure, windspeed, wind direction or sea surface temperature, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 1 and 2 show 10 degree lat/long box average numbers of SHIP/SYNOP and DRIFTER observations received per day throughout the month at Bracknell and assimilated into model runs. All data are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Synop Observations

Table 3 contains a list of stations which are considered to have returned suspect observations of Pressure during the month. The criteria for quality control are given in the header page. The reporting practice of each station is included in the list of statistics.

At the UK Met. Office, we monitor SYNOP pressure after it has been interpolated to our Global NWP Model's surface height. For most synoptic stations (about 75%), the surface pressure (at the model surface) is calculated from the reported station-level pressure, or, if this is not available, the height of a standard pressure-level (e.g. 850 hPa or 700 hPa). If neither of these are available, or if the reported station-level pressure is deemed unreliable, the reported mean sea-level pressure is used (about 25% of SYNOPs).

Aircraft observations

Tables 4A (300-150 hPa) and 4B (1000-301 hPa) contain lists of statistics calculated from data received from all airline carriers.

Figures 3A (300-150 hPa) and 3B (1000-301 hPa) show 10 degree lat/long box average numbers of aircraft reports in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS) received per day throughout the month at Bracknell and assimilated into model runs. Observations with a vector wind difference (compared with the model background field) of >60 m s^{-1} have been excluded. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

Figures 4A-7A (300-150 hPa) and 4B-7B (1000-301 hPa) show wind statistics for AIREP/ASDAR in AIREP/AMDAR code (including AIREP, ACAR, AMDAR, ASDAR and ADS). Observations with a vector wind difference > 60 m s^{-1} have been excluded. Statistics have not been calculated for 10 degree lat/long boxes containing <31 observations.

Figure	Parameter
4	Mean wind vectors
5	Mean observation - background wind vector
6	Mean observation-background speed (m s^{-1})
7	RMS observation-background vector (m s^{-1})

Radiosonde Observations

TABLES 5-7 contain lists of the stations which are considered to have returned suspect observations of geopotential height, vector wind or wind direction, as appropriate, during the month. The criteria for quality control are given on the header page for each table.

Figures 8 and 9 show 10 degree lat/long box average numbers of TEMP 500 hPa GEOPOTENTIAL HEIGHT and TEMP/PILOT 300 hPa WIND observations received per day throughout the month at Bracknell and assimilated into model runs. Data from all hours are included. Box average values are plotted as the nearest whole number (values of x.5 are rounded up). Where the average is more than 999, then 999 is plotted. A box with no observations is blank. If the 24 hour average >0 but <0.5, then 0 is plotted.

APPENDIX I shows details of the gross error limits used in TABLES 5 and 6 and the weights used in the RMS values in TABLE 5.

Satellite Observations

Figures 10-24 show satellite wind statistics for all geostationary satellites. All plots other than **AVAILABILITY** show average data where there are > 10 observations in a 10 degree lat/long box.

Figure	Parameter Plotted	Layer (hPa)
10	Availability/average daily number	701-1000
11	Vector mean wind (observed)	701-1000
12	Observation-background vector wind difference	701-1000
13	Mean observation-background speed differences	701-1000
14	RMS observation-background vector difference	701-1000
15	Availability/average daily number	401-700
16	Vector mean wind (observed)	401-700
17	Observation-background vector wind difference	401-700
18	Mean observation-background speed differences	401-700
19	RMS observation-background vector difference	401-700
20	Availability/average daily number	101-400
21	Vector mean wind (observed)	101-400
22	Observation-background vector wind difference	101-400
23	Mean observation-background speed differences	101-400
24	RMS observation-background vector difference	101-400

Figures 25-39 show sounding statistics from the polar orbitting satellite NOAA-15. Figure 25 shows the mean daily number of ATOVS soundings, and figures 26-39 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
26	Mean	Surface (HIRS8)
27	SD	Surface (HIRS8)
28	Mean	700 (HIRS15)
29	SD	700 (HIRS15)
30	Mean	500-700 (HIRS11)
31	SD	500-700 (HIRS11)
32	Mean	400 (HIRS4)
33	SD	400 (HIRS4)
34	Mean	700 (AMSUA5)
35	SD	700 (AMSUA5)
36	Mean	300 (AMSUA7)
37	SD	300 (AMSUA7)
38	Mean	100 (AMSUA9)
39	RMS	100 (AMSUA9)

Figures 40-54 show sounding statistics from the polar orbitting satellite NOAA-16. Figure 40 shows the mean daily number of ATOVS soundings, and figures 41-54 show mean and standard deviation observation-background differences for brightness temperature, for selected channels.

Figure		Weighting function peak (hPa)
41	Mean	Surface (HIRS8)
42	SD	Surface (HIRS8)
43	Mean	700 (HIRS15)
44	SD	700 (HIRS15)
45	Mean	500-700 (HIRS11)
46	SD	500-700 (HIRS11)
47	Mean	400 (HIRS4)
48	SD	400 (HIRS4)
49	Mean	700 (AMSUA5)
50	SD	700 (AMSUA5)
51	Mean	300 (AMSUA7)
52	SD	300 (AMSUA7)
53	Mean	100 (AMSUA9)
54	RMS	100 (AMSUA9)

Figures 55-69 show sounding statistics from the polar orbitting satellite NOAA-17. Figure 55 shows the mean daily number of ATOVS soundings, and figures 56-69 show mean and standard deviation observation-background differences for brightness temperature for selected channels.

Figure		Weighting function peak (hPa)
56	Mean	Surface (HIRS8)
57	SD	Surface (HIRS8)
58	Mean	700 (HIRS15)
59	SD	700 (HIRS15)
60	Mean	500-700 (HIRS11)
61	SD	500-700 (HIRS11)
62	Mean	400 (HIRS4)
63	SD	400 (HIRS4)
64	Mean	700 (AMSUA5)
65	SD	700 (AMSUA5)
66	Mean	300 (AMSUA7)
67	SD	300 (AMSUA7)
68	Mean	100 (AMSUA9)
69	RMS	100 (AMSUA9)

N.B. All satellite sounding data is bias-corrected (and thinned) before being assimilated in the UKMO NWP model.

3 Composite Observing Systems for the North Atlantic (COSNA)

This section shows statistics for upper air (radiosonde and aircraft) and surface (drifter) data for the North Atlantic area for data received at Bracknell during the month.

TABLE 8 shows quality statistics for **Mean Sea-level Pressure, Windspeed and Wind Direction** received at Bracknell in DRIFTER code during the month for the area 10°N - 80°N, 85°W - 0°W.

TABLE 9 shows quality statistics for **Temperature and Vector Wind** received at Bracknell from aircraft during the month for the area 40°N - 70°N, 60°W - 0°W.

Table 10 - 13 show quality statistics **(Geopotential Height and Windspeed at 100 and 500 hPa)** for all TEMPSHIPS in the area bounded by 0°N - 90°N, 100°W - 40°E and selected TEMP stations within the same area.

Revisions

1. May 95 Monitoring statistics for NOAA-11 removed. Figures 25-27 now show data for NOAA-12
2. May 95 Notes giving details of observations included in wind direction statistics clarified and corrected.
3. August 95 Monitoring statistics for NOAA-14 added with figures 28-30.
4. February 96 Monitoring statistics for GOES-7 have been replaced by statistics for GOES-8 and GOES-9.
5. April 96. 500 km and 120 km SATEMs replaced by 120 km resolution temperature profiles produced locally from the radiances disseminated by NESDIS.
6. February 97 Monitoring statistics for Meteosat 5 have been replaced by statistics for Meteosat 6.
7. Sept 97 Monitoring statistics for NOAA-12 removed. Figures 25-27 now show data for NOAA-11
8. January 1998. Increase in resolution of UKMO global forecast model.
9. April 1998. GOES winds ceased on 2nd March 1998, and were replaced with GOES high resolution winds from 15th.
10. June 1998. Monitoring statistics for Meteosat-6 were replaced by monitoring statistics for Meteosat-7, from 3rd June.
11. June 1998. Corrections in our processing of radiosonde data resulted in a decrease in the number of 500hPa geopotential heights in Figure 8 of about 230 per 24 hours (compared with previous reports), and a small increase in the number of 300hPa winds in Figure 9.
12. July 1998. Meteosat-5 began transmitting winds from 2nd July, at 63 degrees East (over the Indian ocean), and this data is included in the statistics.
13. July 1998. GOES-9 (at 135W) was replaced mid-month by GOES-10 (initially at 105W, moving towards 135W).
14. February 1999. Problems with NOAA-11, and TOVS data ceased to be assimilated from 26 February.
15. March 1999. UKMO introduced 3-D VAR assimilation system on 29 March, and also began assimilating ATOVS data from NOAA-15.
16. May 1999. Included statistics for ATOVS sounding data from NOAA-15.
17. September 1999. Included statistics for high resolution visible winds from Meteosat-5 and Meteosat-7.
18. October 1999. The 3-D VAR assimilation system was upgraded on 19 October, including improvements in the assimilation of ATOVS radiances, use of SSM/I surface wind speed, an improvement in the calculation of surface pressure for SYNOPs, and thinning and revision of observation errors of aircraft data.
19. November 1999. High resolution visible winds from Meteosat-5 and Meteosat-7 removed until used operationally.
20. April 2000. Aireps in Table 4 and Figures 3-7 split into ranges 300-150 hPa (A) and 1000-301 hPa (B).
21. September 2000. Corrected an error affecting the mean positions of a minority of buoys in Table 2.
22. November 2000. An error in the production of Table 6 was corrected. Previously, some sondes with suspect vector winds were being missed.
23. April 2001. Included statistics for ATOVS sounding data from NOAA-16.
24. May 2001. Included statistics for sea surface temperatures from marine surface observations.
25. December 2002. Included statistics for ATOVS sounding data from NOAA-17.
26. December 2002. Meteosat-7 and Meteosat-5 SATOB winds replaced by higher resolution BUFR-coded winds.

TABLE 1

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SHIPS, FIXED BUOYS AND PLATFORMS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for ships, fixed buoys and platforms.
Standard of comparison	:Background field from UKMO global model.
Observation times	:All hours
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (Degrees). :Sea surface temperature (Degrees).

Parameters monitored

:NOBS	:Number of observations received excluding duplicates.
:PGE	:Percentage of observations with gross errors.
:%REJ	:Percentage of observations flagged excluding those with gross errors.
:SD	:SD of difference of observations from background values excluding those with gross errors.
:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**
:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.

GROSS ERROR LIMIT
:15 hPa (pressure)
:25 m s^{-1} (vector wind)
:10 degrees (sea surface temperature)

SELECTION CRITERIA :NOBS ≥ 20 , and one or more of the following:

1.|bias|	≥ 4 hPa	(pressure),
	≥ 5 m s^{-1}	(wind speed),
	≥ 30 degrees	(direction).
	≥ 3 degrees	(sea surface temperature).
2.SD	≥ 6 hPa	(pressure),
	≥ 80 degrees	(direction).
	≥ 5 degrees	(sea surface temperature).
3.PGE	≥ 25	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE							
A3CH5	P	63	8	16	2.5	-4.9	5.5
CG2522	P	631	31	100	3.6	-1.7	4.0
CG2556	P	30	0	23	0.5	-10.5	10.5
CG2992	P	524	39	73	4.7	-4.5	6.5
CTEC	P	24	58	63	4.3	-1.9	4.7
C6KU8	P	31	0	68	1.2	5.0	5.1
DASO	P	21	0	71	1.1	4.1	4.2
DHEB	P	55	0	27	1.2	4.2	4.3
DICB	P	55	0	15	0.9	4.7	4.8
DQVH	P	35	0	49	0.8	4.4	4.5
DQVJ	P	32	0	84	2.2	4.1	4.6
DQVO	P	33	6	15	3.1	4.4	5.4
KMJL	P	33	0	0	0.9	-4.2	4.3
OZFC2	P	25	0	24	4.4	-4.1	6.0
SHIPBB	P	29	34	38	2.9	-1.2	3.2
UAMX	P	44	0	39	1.1	-4.8	4.9
UCJB	P	21	0	5	1.0	-4.5	4.6
UCJS	P	29	0	97	1.0	-5.8	5.9
UCUE	P	68	4	53	5.6	-4.0	6.9
UHVV	P	20	0	60	2.3	-4.7	5.2
VGJD	P	33	82	100	2.2	13.7	13.9
V7EM6	P	21	0	76	0.6	4.1	4.1
WDCJ	P	27	0	22	4.3	5.4	6.9
WDJK	P	28	0	18	0.8	-4.3	4.4
WUW2120	P	24	96	100	0.0	-10.5	10.5
XPYM	P	98	0	4	1.6	4.9	5.2
ZCBD2	P	40	32	97	2.1	7.3	7.6
62166	P	87	0	72	3.8	4.0	5.5
9KWK	P	41	0	2	1.7	-4.0	4.3
9MCM4	P	27	0	11	0.7	4.1	4.2
WIND SPEED							
BBXX KS0	SPEED	236	0	100	2.0	-5.1	5.5
C6SM9	SPEED	33	0	18	4.8	5.2	7.1
ELTY4	SPEED	22	0	100	5.3	7.6	9.3
ELZX7	SPEED	21	0	90	4.7	5.1	6.9
HP6038	SPEED	223	0	0	3.1	5.6	6.4
KS004	SPEED	199	0	100	2.0	-5.8	6.1
KS010	SPEED	67	0	100	1.1	-6.0	6.1
VJBF	SPEED	36	6	36	4.8	5.9	7.6
VTXK	SPEED	37	0	100	4.9	5.3	7.2
V2FN	SPEED	26	0	27	5.1	7.7	9.2
3ETX6	SPEED	82	10	100	4.2	5.0	6.5
3FEI6	SPEED	35	0	17	3.2	7.2	7.9
WIND DIRECTION							
23101	DIRN.	71	0	0	52.9	72.8	90.0
23168	DIRN.	90	0	0	16.3	101.7	103.0
43011	DIRN.	21	0	0	20.2	33.4	39.1
SEA SURFACE TEMPERATURE							
CG2522	SST	591	94	99	3.2	6.5	7.3
CG2960	SST	35	0	100	3.0	5.7	6.5
CG2992	SST	486	100	100			
CG8048	SST	52	98	100	0.0	-6.4	6.4
C6IZ7	SST	31	0	100	1.6	4.2	4.4
C6QO9	SST	24	0	100	1.5	4.1	4.4
DBBX	SST	629	78	100	1.6	-0.4	1.7
DBBXX	SST	45	62	100	1.2	-0.1	1.2
DHDH	SST	22	0	9	1.1	-3.0	3.2

DQVO	SST	28	0	32	1.5	3.3	3.7
EIQN	SST	658	57	100	0.6	0.1	0.6
ELWY3	SST	34	6	100	0.9	3.3	3.4
ELZL3	SST	193	33	58	2.2	2.6	3.3
ELZW9	SST	20	0	100	0.4	3.0	3.1
FNJI	SST	122	0	100	1.4	3.7	3.9
H9TO	SST	29	3	100	0.3	3.4	3.5
KAKF	SST	26	38	92	1.7	6.3	6.6
KCB53	SST	25	0	96	1.8	6.3	6.6
KRPB	SST	74	0	100	2.7	-3.4	4.3
KS025	SST	222	59	93	1.9	-0.1	1.9
KUU619	SST	24	96	100	0.0	5.3	5.3
PHPO	SST	77	1	12	0.7	-3.0	3.1
P3CV9	SST	25	0	16	1.2	-3.0	3.2
S6HU4	SST	20	40	65	2.6	-4.8	5.5
TOUR	SST	135	2	96	1.3	7.7	7.8
TSLN	SST	160	0	36	1.5	-3.7	4.0
TSMS	SST	111	2	100	0.9	-4.6	4.7
UCBM	SST	45	0	100	3.0	-4.6	5.5
UCJI	SST	22	5	100	2.4	-4.4	5.0
UCON	SST	50	6	46	3.6	-3.5	5.0
UHOM	SST	34	0	94	0.8	-5.9	6.0
UHVW	SST	22	5	9	0.5	3.2	3.2
UIBM	SST	23	0	100	1.2	3.0	3.2
VDLC	SST	44	9	59	3.1	-3.1	4.3
VGLZ	SST	21	100	100			
VOCJ	SST	232	0	100	1.7	3.9	4.3
VRSR	SST	35	3	97	1.2	6.7	6.8
V2IA1	SST	24	0	100	4.0	-3.3	5.2
WCW9126	SST	83	94	100	1.0	1.3	1.6
WN4201	SST	28	71	71	1.0	-2.2	2.4
WWU8	SST	29	100	100			
YJQL3	SST	41	0	100	1.0	-4.4	4.5
ZCBD2	SST	38	39	100	1.4	-1.2	1.9
ZCDH7	SST	26	0	54	0.9	4.2	4.3
3FIQ7	SST	32	0	50	4.5	3.6	5.8
3FJV4	SST	28	4	36	0.9	3.6	3.7
44008	SST	694	0	63	2.5	-4.2	4.9
44018	SST	689	0	57	2.6	-4.1	4.8
44034	SST	517	0	60	1.3	-3.4	3.7
45002	SST	231	0	45	1.6	3.2	3.6
45139	SST	664	0	67	2.4	-3.7	4.4
45140	SST	649	100	100			
45141	SST	395	58	79	3.7	4.1	5.6
45144	SST	661	100	100			
45145	SST	661	100	100			
45147	SST	669	100	100			
45148	SST	663	100	100			
45150	SST	513	39	83	2.1	4.4	4.9
45151	SST	601	0	100	1.8	4.4	4.8
45152	SST	483	100	100			
45154	SST	29	0	100	0.3	3.9	3.9
45160	SST	628	18	94	2.5	-6.6	7.0
46131	SST	651	100	100			
46146	SST	538	100	100			
46181	SST	637	100	100			

Figure 1. SHIP/SYNOP mean daily count. JULY 2003
All hours
Global average number of observations in 24 hours = 19941

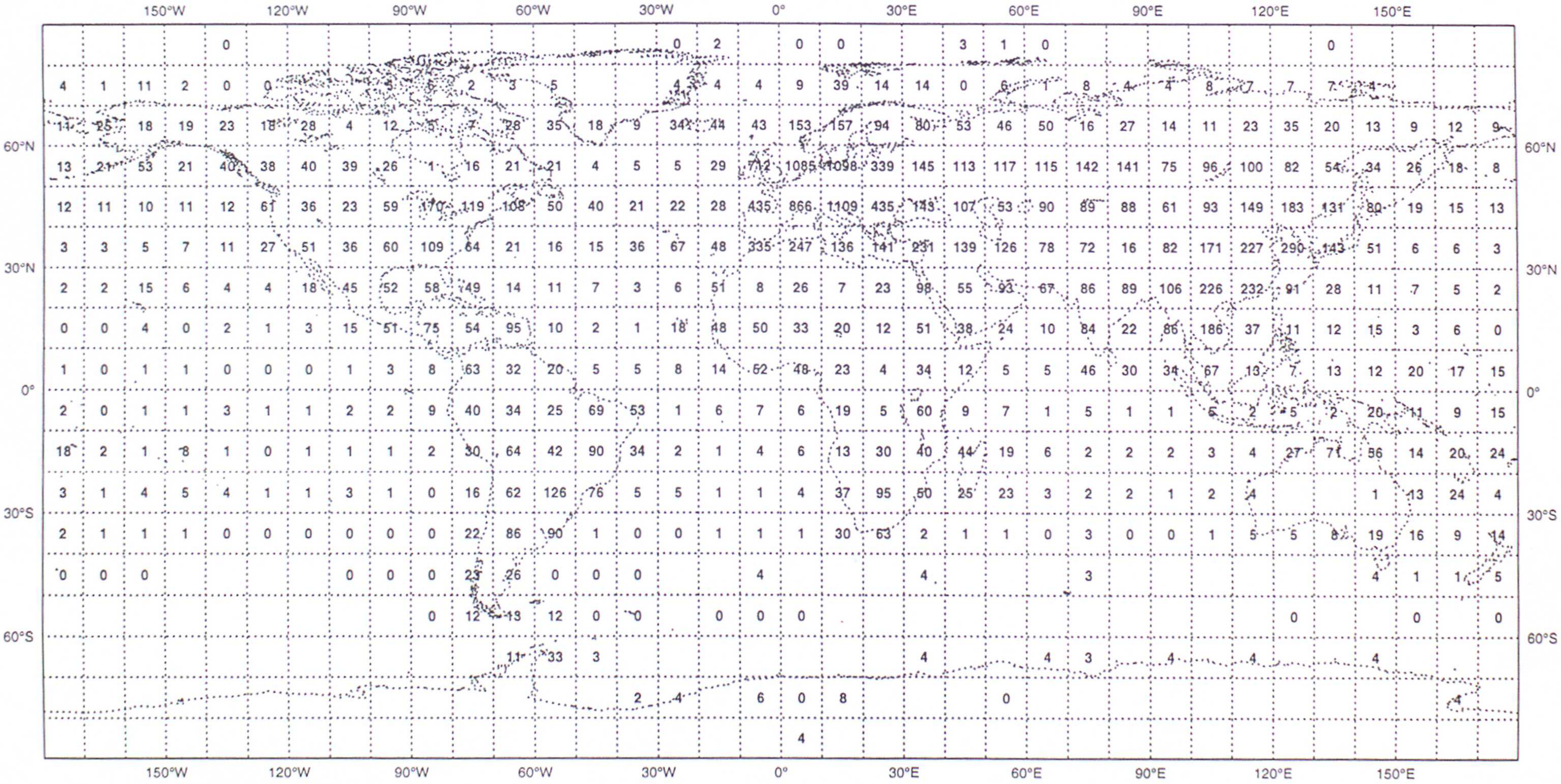

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 0 2 0 0 3 1 0 0
4 1 11 2 0 0 5 6 2 3 5 4 4 4 9 39 14 14 0 6 1 8 4 4 8 7 7 7 4
14 25 18 19 23 18 28 4 12 5 7 28 35 18 9 34 44 43 153 157 94 80 53 46 50 16 27 14 11 23 35 20 13 9 12 9
13 21 53 21 40 38 40 39 26 1 16 21 21 4 5 5 29 712 1085 1098 339 145 113 117 115 142 141 75 96 100 82 54 34 26 18 8
12 11 10 11 12 61 36 23 59 170 119 108 50 40 21 22 28 435 866 1109 435 143 107 53 90 89 88 61 93 149 183 131 80 19 15 13
3 3 5 7 11 27 51 36 60 109 64 21 16 15 36 67 48 335 247 136 141 231 139 126 78 72 16 82 171 227 290 143 51 6 6 3
2 2 15 6 4 4 18 45 52 58 49 14 11 7 3 6 51 8 26 7 23 98 55 93 67 86 89 106 226 232 91 28 11 7 5 2
0 0 4 0 2 1 3 15 51 75 54 95 10 2 1 18 48 50 33 20 12 51 38 24 10 84 22 86 186 37 11 12 15 3 6 0
1 0 1 1 0 0 0 1 3 8 63 32 20 5 5 8 14 52 48 23 4 34 12 5 5 46 30 34 67 13 7 13 12 20 17 15
2 0 1 1 3 1 1 2 2 9 40 34 25 69 53 1 6 7 6 19 5 60 9 7 1 5 1 1 6 2 5 2 20 11 9 15
18 2 1 8 1 0 1 1 1 2 30 64 42 90 34 2 1 4 6 13 30 40 44 19 6 2 2 2 3 4 27 71 56 14 20 24
3 1 4 5 4 1 1 3 1 0 16 62 126 76 5 5 1 1 4 37 95 50 25 23 3 2 2 1 2 4 1 13 24 4
2 1 1 1 0 0 0 0 0 0 22 86 90 1 0 0 1 1 1 30 63 2 1 1 0 3 0 0 1 5 5 8 19 16 9 14
0 0 0 0 0 0 23 26 0 0 0 4 4 3 4 1 1 5
0 12 13 12 0 0 0 0 0 0 0 0
11 33 3 4 4 3 4 4 4
2 4 6 0 8 0 4
4

TABLE 2

MONITORING OF MARINE SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - DRIFTING BUOYS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period	:One calendar month.
Data monitored	:Reports from each unique identifier for drifting buoys.
Standard of comparison	:Background field from UKMO global model.
Position	:Average latitude and longitude for period.
Observation times	: All hours
Elements monitored	:Mean sea level pressure (hPa). :Wind speed (m s^{-1}). :Wind direction (degrees). :Sea surface temperature (degrees).

Parameters monitored			
	:NOBS	:Number of observations received excluding duplicates.	
	:PGE	:Percentage of observations with gross errors.	
	:%REJ	: Percentage of observations flagged excluding those with gross errors	
	:SD	:SD of difference of observations from background values excluding those with gross errors.	
	:BIAS	:Mean difference of observations from background values excluding those with gross errors. **N.B. a positive bias indicates the wind observation is veered to the background.**	
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.	
GROSS ERROR LIMIT	:15 hPa	(pressure)	
	:25 m s^{-1}	(vector wind)	
	:10 degrees	(sea surface temperature)	
SELECTION CRITERIA :	NOBS	≥ 20 , and one or more of the following:	
	1.|bias|	≥ 4 hPa	(pressure),
		≥ 5 m s^{-1}	(wind speed),
		≥ 30 degrees	(direction).
		≥ 3 degrees	(sea surface temperature).
	2.SD	≥ 6 hPa	(pressure),
		≥ 80 degrees	(direction).
		≥ 5 degrees	(sea surface temperature).
	3.PGE	≥ 25.	

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
23600	6.6	73.1	P	96	81	95	3.5	7.4	8.2
41643	27.3	-73.0	P	654	100	100			
41649	16.3	-61.1	P	594	0	100	0.4	-5.3	5.3
41651	25.4	-67.3	P	542	100	100			
46707	42.3	-167.7	P	108	0	60	6.2	0.5	6.2
48585	81.2	-115.4	P	39	13	85	3.0	5.9	6.6
56537	-26.4	106.2	P	205	73	100	2.5	11.0	11.2
WIND DIRECTION									
13600	16.3	-25.4	DIRN.	379	0	0	16.5	35.9	39.5
13602	18.2	-28.8	DIRN.	116	0	0	8.9	35.1	36.2
41532	22.8	-70.5	DIRN.	339	0	0	9.2	41.8	42.8
41537	27.8	-58.5	DIRN.	246	0	0	14.1	-34.6	37.4
SEA SURFACE TEMPERATURE									
13938	18.0	-55.1	SST	117	82	100	2.6	-7.8	8.2
33502	-29.3	-16.2	SST	140	7	100	0.4	3.0	3.0
41651	25.4	-67.3	SST	1130	3	100	0.4	-4.0	4.1
44507	41.3	-46.6	SST	117	17	82	2.8	-4.8	5.5
44837	42.2	-64.7	SST	113	25	25	0.9	0.8	1.2
46598	42.9	-124.5	SST	119	3	97	1.4	-6.1	6.2
46599	41.4	-125.9	SST	230	5	54	1.5	-3.2	3.5
46780	63.9	-177.6	SST	1031	5	100	1.2	4.0	4.2
46972	19.0	-156.7	SST	279	6	100	0.5	5.2	5.2
51642	-8.8	-177.1	SST	114	98	100	0.7	-8.4	8.4
51727	-14.3	173.9	SST	346	35	95	2.3	-3.8	4.4
51768	-13.7	171.1	SST	330	2	100	1.6	-4.1	4.4
62508	43.6	-2.2	SST	110	35	53	2.1	-1.0	2.3

Figure 2. DRIFTER mean daily count. JULY 2003
All hours
Global average number of observations in 24 hours = 11944

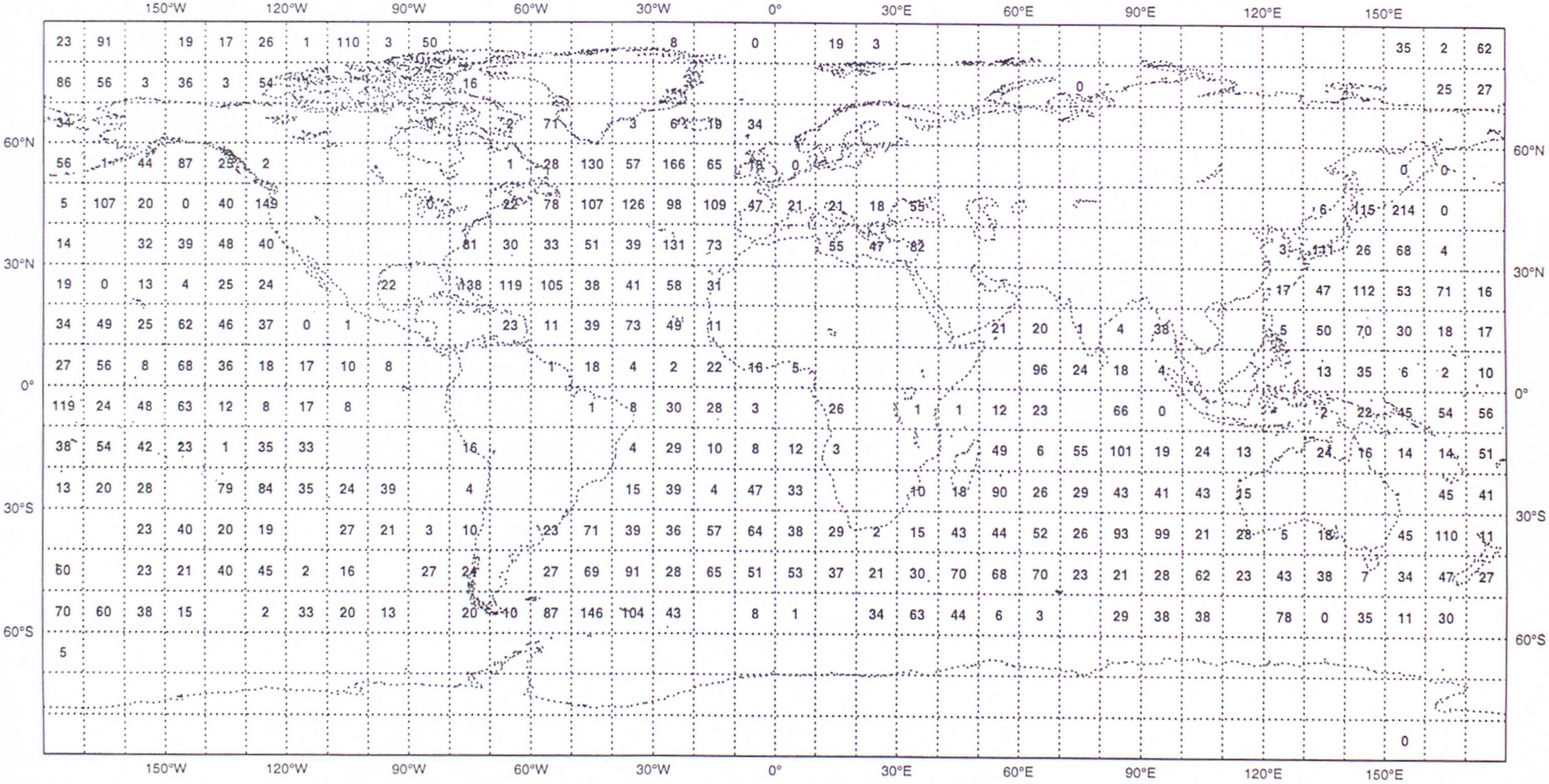

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
23 91 19 17 26 1 110 3 50 8 0 19 3 35 2 62
86 56 3 36 3 54 16 0 25 27
34 2 71 3 62 19 34
56 1 44 87 23 2 1 28 130 57 166 65 18 0 0 0
5 107 20 0 40 149 0 22 78 107 126 98 109 47 21 21 18 55 6 115 214 0
14 32 39 48 40 81 30 33 51 39 131 73 55 47 82 3 131 26 68 4
19 0 13 4 25 24 22 138 119 105 38 41 58 31 17 47 112 53 71 16
34 49 25 62 46 37 0 1 23 11 39 73 49 11 21 20 1 4 38 5 50 70 30 18 17
27 56 8 68 36 18 17 10 8 1 18 4 2 22 16 5 96 24 18 4 13 35 6 2 10
119 24 48 63 12 8 17 8 1 8 30 28 3 26 1 1 12 23 66 0 2 22 45 54 56
38 54 42 23 1 35 33 16 4 29 10 8 12 3 49 6 55 101 19 24 13 24 16 14 14 51
13 20 28 79 84 35 24 39 4 15 39 4 47 33 10 18 90 26 29 43 41 43 15 45 41
23 40 20 19 27 21 3 10 23 71 39 36 57 64 38 29 2 15 43 44 52 26 93 99 21 28 5 18 45 110 11
50 23 21 40 45 2 16 27 24 27 69 91 28 65 51 53 37 21 30 70 68 70 23 21 28 62 23 43 38 7 34 47 27
70 60 38 15 2 33 20 13 20 10 87 146 104 43 8 1 34 63 44 6 3 29 38 38 78 0 35 11 30
5
0

TABLE 3

MONITORING OF LAND SURFACE OBSERVATIONS
MONTHLY SUSPECT LIST - SYNOPS & AUTOSYNOPS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for synops & autosynops.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00, 06, 12, 18 UTC
Elements monitored		:Surface pressure (hPa).
Parameters monitored	:HT(m)	:Station height (in metres) as given in WMO No. 9 Vol A
	:RP	:Pressure reporting practice M=mean sea level pressure (hPa) reported. S=Station level pressure reported. 8=Geopotential height (m) of 850 hPa surface reported. 7=Geopotential height (m) of 700 hPa surface reported.
	:NOBS	:Number of observations received excluding duplicates.
	:NGE	:Number of observations with gross errors.
	:PGE	:Percentage of observations with gross errors.
	:%REJ	:Percentage of observations flagged excluding those with gross errors.
	:SD	:SD of difference of observations from background values excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors.
GROSS ERROR LIMIT	:15 hPa	(pressure)
SELECTION CRITERIA	:NOBS	≥ 20 ,and one or more of the following:
	1.|bias|	≥ 4 hPa
	2. SD	≥ 6 hPa
	3.PGE	≥ 25.

N.B. For stn ht ≥ 500m, mslp is that calculated from station level pressure where available.
For stn ht < 500m, mslp is that as reported by the station where available.

SUSPECT SYNOPS (PRESSURE) BY WMO REGION JUL 2003

WMO REGION 1:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
60728	36.4N	10.7E	1	MS	61	0	0	0	0.7	-8.5	8.5
62056	32.8N	21.8E	625	M	64	0	0	73	1.0	-5.0	5.1
63330	13.5N	39.5E	2070	MS	22	22	100	0			
63333	11.1N	39.7E	1903	MS	22	0	0	0	1.0	5.5	5.6
63334	10.3N	37.7E	2515	MS	22	1	5	0	0.7	11.3	11.3
63478	5.9N	43.6E	295	MS	21	0	0	33	1.5	4.7	4.9
63801	4.9S	29.6E	882	S8	54	2	4	4	0.8	7.2	7.2
63881	8.0S	31.6E	1923	S	48	4	8	2	0.7	12.5	12.5
65355	9.8N	1.1E	342	MS	79	0	0	0	0.7	-13.2	13.2
66285	11.8S	19.9E	1357	8	21	18	86	0	0.5	13.7	13.7
67223	13.1S	39.0E	534	S8	51	1	2	6	3.3	12.2	12.6
68014	19.6S	18.1E	1411	S8	65	2	3	0	0.5	-7.0	7.0
68030	18.5S	25.6E	1071	S8	88	0	0	0	4.6	7.8	9.1
68312	26.5S	18.1E	1067	S8	63	0	0	0	0.7	4.7	4.8
68338	26.9S	24.6E	1234	S8	71	71	100	0			
68396	26.5S	31.3E	641	S8	58	0	0	5	1.9	4.3	4.7
68575	30.0S	30.0E	1175	S8	119	119	100	0			

WMO REGION 2:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
30554	54.5N	113.6E	995	MS	123	0	0	0	5.1	5.3	7.4
35416	49.1N	54.7E	128	M	32	0	0	0	0.7	4.3	4.4
36982	41.9N	78.2E	3635	S7	116	1	1	3	1.8	6.6	6.8
38565	40.6N	65.7E	485	MS	123	65	53	0	2.0	0.2	2.0
40435	24.5N	44.4E	991	MS	54	1	2	24	0.5	7.9	7.9
40700	39.6N	47.9E	45	MS	115	0	0	1	0.8	-5.0	5.1
40713	37.4N	46.3E	1475	MS	123	5	4	0	0.8	12.9	12.9
40726	36.8N	45.7E	1384	MS	121	3	2	0	0.9	4.4	4.5
40734	36.5N	51.6E	-25	MS	117	0	0	16	0.9	4.2	4.3
40741	36.5N	61.2E	235	MS	117	0	0	3	1.1	-4.3	4.4
40780	33.6N	46.4E	1362	MS	112	1	1	0	0.6	5.4	5.4
41254	23.1N	57.6E	1755	S8	84	84	100	0			
44265	46.1N	91.5E	1186	MS	113	3	3	2	0.9	6.7	6.8
44416	28.6N	81.6E	720	MS	68	0	0	1	1.3	4.5	4.7
47022	40.8N	128.2E	1224	S	106	0	0	0	0.9	4.1	4.2
48924	21.1N	101.5E	644	S	41	1	2	5	0.7	11.0	11.0
48925	20.7N	102.0E	550	S	50	0	0	0	0.7	-10.0	10.0
48938	19.2N	101.7E	326	MS	32	14	44	0	3.5	13.3	13.8
48957	14.8N	106.8E	105	MS	29	0	0	0	0.5	4.3	4.3
50727	47.2N	119.9E	1028	MS	123	0	0	0	0.7	4.2	4.3
51495	43.2N	91.7E	874	M	112	0	0	0	1.0	6.5	6.6
52866	36.6N	101.8E	2262	S	123	0	0	0	0.8	-4.0	4.1
56462	29.0N	101.5E	2994	S	122	0	0	0	1.0	8.0	8.1
56768	25.0N	101.5E	1773	S	123	0	0	0	0.5	-5.6	5.6
57816	26.6N	106.7E	1074	MS	123	25	20	0	0.4	-14.4	14.4

WMO REGION 3:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
80099	7.1N	70.7W	122	MS	35	0	0	0	1.4	-6.3	6.5
80315	3.0N	75.3W	439	MS	90	0	0	0	1.0	-4.1	4.2
82181	2.0S	54.1W	146	MS	88	0	0	0	0.5	4.8	4.8
82704	7.6S	72.7W	170	MS	85	0	0	0	0.8	-4.5	4.6
83235	12.4S	46.4W	604	MS	92	0	0	0	0.5	6.6	6.6
83332	14.1S	46.4W	826	MS	92	24	26	0	0.6	14.3	14.3
83470	17.9S	50.9W	727	MS	91	1	1	1	0.7	-5.7	5.7
83531	18.6S	46.5W	940	MS	92	1	1	1	0.8	-7.4	7.4

83738	22.5S	44.5W	440	MS	54	0	0	69	1.3	-4.3	4.5
83836	25.5S	50.6W	837	MS	92	0	0	0	0.7	-5.4	5.4
84401	5.2S	80.6W	49	MS	121	0	0	0	0.8	4.0	4.1
84455	6.5S	76.4W	281	MS	91	0	0	1	1.3	7.3	7.4
84472	7.1S	78.5W	2620	S	60	2	3	0	0.7	-5.3	5.3
84474	7.2S	76.7W	350	S	26	1	4	4	1.3	9.3	9.4
84686	13.6S	72.0W	3248	S	118	0	0	0	0.9	-4.7	4.8
84688	13.7S	73.4W	3444	S	55	0	0	0	0.4	-12.4	12.4
84720	14.9S	75.0W	567	MS	62	0	0	0	1.0	5.9	6.0
84782	18.1S	70.3W	468	MS	94	0	0	0	1.5	8.4	8.5
85140	14.3S	67.4W	140	MS	59	0	0	0	0.9	6.5	6.6
85264	18.5S	64.1W	1998	S	61	3	5	0	1.6	-10.8	10.9
85312	19.8S	63.9W	992	S	48	0	0	10	1.5	-9.1	9.2
85406	18.3S	70.3W	55	M	119	0	0	0	1.1	4.6	4.7
85432	22.5S	68.9W	2320	S8	83	0	0	0	0.8	4.8	4.9

WMO REGION 4:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
71049	66.0N	91.8W	150	MS	123	96	78	0	1.2	13.7	13.8
71181	47.1N	55.3W	29	MS	123	0	0	0	0.7	-5.9	5.9
71475	49.3N	124.8W	2	MS	122	0	0	0	0.7	-8.2	8.2
71747	48.8N	91.6W	424	MS	123	0	0	0	0.6	4.1	4.1
72327	36.1N	86.7W	182	MS	118	0	0	0	0.6	4.0	4.0
76055	31.0N	114.9W	440	MS	60	60	100	0			
76543	22.0N	98.8W	104	MS	23	0	0	0	1.0	7.4	7.5
76658	19.2N	103.7W	494	MS	36	0	0	0	0.9	5.6	5.7
76683	19.3N	98.3W	2248	MS	83	0	0	0	0.5	4.2	4.2
76762	17.5N	99.5W	1265	S	61	2	3	2	1.2	6.1	6.2
76903	14.9N	92.3W	118	MS	42	0	0	0	0.7	5.6	5.6
78588	17.2N	87.5W	-285	M	122	103	84	0	0.4	0.6	0.7

WMO REGION 5:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
92010	6.1S	145.4E	1587	M	24	0	0	96	1.2	7.8	7.9
94130	14.8S	131.9E	120	MS	123	0	0	0	1.0	5.4	5.5
94541	29.8S	151.1E	584	MS	121	0	0	0	0.6	-9.2	9.2
96505	3.7N	115.7E	943	S8	34	32	94	0	0.5	2.6	2.6
97378	10.7S	123.1E	1	MS	46	46	100	7			

WMO REGION 6:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
01360	61.9N	7.9E	711	MS	122	0	0	0	0.6	5.7	5.7
06685	47.0N	9.1E	515	MS	123	0	0	0	1.1	5.9	6.0
06780	46.8N	9.8E	2690	S7	123	0	0	2	0.6	4.5	4.5
08912	42.9N	0.8W	1434	MS	102	102	100	0			
08922	42.8N	0.2W	1660	MS	344	344	100	0			
10850	48.8N	10.7E	457	MS	369	0	0	0	0.6	-5.3	5.3
13269	44.3N	19.9E	176	MS	123	0	0	0	0.9	7.3	7.4
14554	44.9N	18.4E	136	S	62	2	3	3	0.9	-12.9	12.9
14650	43.8N	18.0E	970	S	62	62	100	16			
16344	39.3N	16.4E	1710	S8	27	0	0	0	1.1	5.7	5.8
16538	40.1N	9.3E	1022	S	34	0	0	0	0.7	8.9	8.9
17203	38.9N	40.5E	1177	S8	123	0	0	0	0.8	4.9	5.0

ANTARCTIC:

STATION	LAT	LONG	HT(M)	RP	NOBS	NGE	PGE	%REJ	SD	BIAS	RMS
89004	71.7S	2.8W	815	MS	106	0	0	2	1.6	-8.1	8.3
89253	63.2S	55.4W	75	M	230	2	1	0	3.5	4.3	5.5
89263	66.0S	66.1W	20	M	272	106	39	0	8.2	5.1	9.7
89264	71.4S	68.9W	780	S	301	0	0	0	1.2	6.8	6.9
89272	75.0S	70.8W	1395	S	202	202	100	0			
89512	70.8S	11.8E	140	MS	122	0	0	0	1.6	-4.3	4.6
89610	65.9S	113.1E	90	S	290	0	0	1	1.4	-7.5	7.6
89614	66.6S	111.2E	500	S	298	298	100	0			
89744	74.0S	43.1E	3353	S	316	0	0	0	1.0	7.4	7.5
89767	70.9S	69.9E	84	S	122	0	0	0	1.8	-4.6	4.9
89811	66.7S	112.8E	1366	S	285	0	0	0	1.3	-4.6	4.8
89868	79.9S	170.0E	60	S	328	0	0	0	1.4	-4.2	4.4

TABLE 4A

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :300.0 - 150.0 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP ≥ 20

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

Note for July 2003

Please note that due to operational difficulties associated with the Met Office relocation to Exeter, approximately 1 weeks worth of AMDAR data has not been included, which is reflected in the reduced data volumes compared to other months. This further means that the 24 hour global average number of observations shown in Figures 3a and 3b are incorrect.

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAH	3068	0	41	1.4	0.2	3046	0	41	0	5.1	0.5
AAL	6491	1	37	1.7	0.1	6301	0	36	0	5.4	0.2
AAR	1455	0	5	1.6	-0.5	1445	0	6	0	7.0	0.2
ACA	2402	0	5	1.7	-0.2	2128	0	5	0	6.7	0.4
ACI	50	6	42	2.4	0.4	52	0	44	0	18.6	-1.4
AEA	1034	0	3	1.6	0.3	719	0	3	0	5.7	0.8
AEL	346	1	11	1.8	-0.2	313	0	11	0	6.7	0.8
AEW	84	0	1	1.8	-0.7	83	1	8	0	9.6	0.8
AFL	563	1	4	2.1	0.3	472	0	4	0	6.9	0.5
AFR	1530	1	7	1.6	0.1	1366	0	7	0	6.6	0.8
AIS	320	1	10	1.4	-0.4	319	0	12	0	7.9	0.2
AJM	403	0	2	1.2	-0.1	371	0	2	0	5.4	0.8
AJX	278	0	5	1.9	1.2	270	0	5	0	7.4	1.0
AMM	153	0	2	1.4	0.5	138	0	8	0	7.6	1.3
AMT	1785	0	41	0.9	-0.1	1780	0	41	0	5.0	-0.4
AMX	297	1	2	1.6	0.2	262	0	5	0	7.7	0.6
ANA	25	0	0	1.2	-0.1	26	0	0	0	5.1	-0.4
ANZ	4283	0	27	1.3	0.1	4271	0	27	0	5.9	0.5
ARG	48	2	35	2.0	-0.3	39	0	33	0	16.4	2.2
ATN	88	0	100	4.7	-4.3	87	0	29	0	9.9	1.8
AVA	208	0	2	1.7	1.1	163	0	3	0	6.5	1.5
AVN	119	0	45	0.9	0.3	119	0	45	0	5.1	0.6
AXF	37	0	43	1.6	-0.8	37	3	49	0	16.6	2.0
AZA	548	1	6	1.5	-0.2	501	0	6	0	7.2	0.2
BAF	31	0	3	2.3	-0.1	33	0	0	0	4.6	-0.1
BAL	198	0	6	1.1	0.3	188	0	7	0	6.6	0.3
BAW	702	0	9	1.8	-0.3	655	0	9	0	6.1	0.3
BBR	160	1	3	1.7	0.6	131	0	2	0	8.0	2.2
BPA	240	0	10	1.2	0.0	222	0	11	0	6.5	0.6
BRA	21	0	33	2.2	-0.4	20	0	30	0	6.6	1.0
BSK	71	7	23	1.6	-0.1	73	0	15	0	6.3	1.0
BWA	282	0	2	1.4	0.1	239	0	3	0	6.2	1.2
CAL	58	2	3	1.9	0.2	61	0	7	0	8.2	0.5
CCA	145	2	16	2.3	0.5	145	0	100	0	10.0	-0.2
CES	151	1	7	1.5	0.4	153	2	10	0	9.0	-0.5
CFC	49	0	4	1.8	-0.3	47	0	4	0	5.0	0.7
CFG	808	0	4	1.7	-0.5	706	0	3	0	6.2	0.7
CGH	23	0	0	0.9	-0.3	20	0	0	0	3.9	1.2
CKK	97	0	3	1.4	0.6	97	0	7	0	9.9	0.6
CKS	458	0	25	2.3	1.0	445	0	24	0	7.8	-0.5
CLX	374	1	3	1.8	-0.3	305	0	4	0	7.3	0.0
COA	166	0	32	1.4	0.3	144	0	35	0	7.6	1.3
CRL	686	1	1	1.3	0.4	614	0	1	0	5.8	0.8
CSA	28	0	4	2.2	-0.7	30	0	0	0	5.4	1.1
CSN	50	0	8	1.8	0.3	52	0	10	0	8.7	-0.6
CUB	161	2	6	1.6	0.4	149	0	7	0	8.4	0.5
DAB	49	0	12	1.2	-0.5	47	0	13	0	3.4	0.6
DAI	45	0	2	0.9	0.2	41	0	2	0	2.4	0.5
DAL	2749	0	32	1.4	-0.1	2616	0	33	0	5.9	0.1
DBR	33	0	9	2.1	-0.9	31	0	3	0	6.2	0.0
DCE	274	1	4	1.1	-0.5	257	0	5	0	5.8	0.7
DCS	20	5	10	1.9	-0.2	21	0	14	0	11.1	3.0
DHL	126	1	100	6.5	-6.4	122	1	100	0	15.9	4.0
DLH	1079	1	17	1.8	-0.4	1004	0	18	0	7.6	0.7
EDW	109	0	3	1.1	0.0	103	0	3	0	5.3	1.6
EEZ	76	1	7	1.6	0.2	76	0	7	0	6.9	1.6
EIA	345	1	23	2.5	1.0	339	1	100	0	17.0	4.5
ELY	328	1	5	1.4	0.0	303	0	5	0	7.5	0.2
ETH	20	0	20	2.5	-0.4	21	0	14	0	5.4	0.8

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
EVA	73	1	5	1.7	-0.1	75	0	4	0	6.8	0.0
FDX	2023	1	43	1.4	0.2	2006	0	42	0	6.7	0.4
FIN	333	0	4	1.7	0.1	306	0	3	0	6.6	0.6
FJI	1024	3	45	1.4	0.6	1001	0	45	0	7.2	0.5
FOM	660	0	37	1.5	-0.4	650	1	37	0	5.6	0.8
FWQ	40	0	50	1.1	-0.5	40	0	50	0	4.1	0.6
GAF	51	0	6	1.9	-0.5	49	0	6	0	6.5	1.3
GCO	369	1	8	1.5	-0.1	371	1	100	0	10.4	1.3
GHA	32	0	0	1.0	-0.1	25	0	8	0	11.5	-1.5
GRL	108	0	0	1.3	0.0	93	0	2	0	6.0	1.7
GTI	247	4	23	2.5	0.6	251	0	15	0	8.6	0.2
HAL	4872	0	38	1.1	-0.2	4826	0	39	0	5.3	-0.1
HLN	60	0	3	1.5	-0.6	55	0	2	0	7.1	1.0
HRH	119	0	61	1.1	0.0	119	0	61	0	7.6	2.2
IBE	2627	1	5	1.6	0.4	2182	0	5	0	6.1	0.6
ICE	757	1	3	1.7	-0.1	690	0	3	0	6.7	0.9
IWD	350	0	1	1.3	0.2	297	1	2	0	5.7	1.3
JAA	69	0	0	2.0	1.7	68	0	0	0	6.0	1.7
JAL	2061	0	4	1.8	0.3	2008	0	4	0	8.0	0.7
JAZ	1052	0	3	1.7	1.2	1037	0	3	0	7.0	0.8
JBU	71	1	1	0.8	0.3	73	0	1	0	5.5	1.3
KAI	25	0	28	2.4	2.0	26	0	35	0	8.3	1.2
KAL	2834	0	8	1.7	-0.1	2813	0	8	0	7.1	0.2
KLM	1662	0	4	1.7	0.0	1483	0	4	0	6.0	0.7
LAN	500	0	7	1.7	-0.2	497	0	7	0	6.3	0.7
LAP	97	0	43	1.9	0.6	96	0	44	0	8.8	0.5
LDA	23	0	13	0.7	0.2	22	0	14	0	6.6	0.1
LDI	511	0	5	1.2	-0.5	417	0	5	0	6.5	0.6
LOT	112	0	4	1.8	-1.1	101	0	7	0	6.9	0.3
LTU	871	1	4	1.3	-0.1	742	0	4	0	6.5	1.0
LXR	105	0	8	2.2	-0.1	103	0	5	0	5.8	1.4
MAS	246	0	7	1.5	0.1	243	0	8	0	7.0	0.0
MON	135	1	2	1.6	-0.1	120	0	2	0	5.7	0.7
MPD	274	0	5	2.3	1.2	223	0	1	0	5.2	0.9
MPH	682	0	5	1.8	-0.8	619	0	5	0	7.4	0.3
MYT	330	0	3	1.5	-0.2	322	0	2	0	6.0	0.5
NAO	372	1	38	1.0	-0.3	369	0	38	0	5.3	-0.4
NCA	1067	0	4	1.9	0.3	768	0	4	0	6.8	0.2
NWA	8441	1	10	1.7	0.1	8349	0	10	0	7.9	0.2
NZL	2405	0	10	1.5	-0.5	2405	0	10	0	4.6	0.3
OAE	546	0	34	1.2	-0.4	537	0	44	0	10.5	1.5
OOM	177	0	10	2.9	2.0	156	0	6	0	6.9	0.2
PAC	615	0	16	1.8	0.3	611	0	16	0	7.9	0.4
PAL	1102	0	7	1.4	0.0	1051	0	8	0	8.4	-0.1
PAO	332	0	57	1.2	0.2	335	1	57	0	8.6	0.4
PCE	23	0	4	2.1	0.6	23	0	0	0	4.7	1.6
PLM	113	0	3	1.4	0.9	81	0	1	0	6.3	1.1
PUA	21	5	38	2.3	-0.2	21	0	33	0	11.3	5.9
QFA	2894	0	49	1.2	0.2	2885	0	49	0	5.5	0.1
RAM	331	0	4	1.6	0.4	236	0	100	0	8.9	0.4
RCH	226	0	19	2.5	0.1	213	0	100	0	10.9	1.3
ROM	22	5	5	4.0	4.0	22	0	5	0	6.9	0.7
RRR	28	7	11	1.5	-0.1	26	0	8	0	4.9	-0.1
RYN	25	0	100	0.7	0.2	25	0	44	0	4.2	-0.3
RZO	463	1	4	1.3	-0.4	332	0	5	0	8.3	0.7
SAA	399	1	2	1.2	-0.2	361	0	2	0	6.9	0.8
SEU	122	1	3	1.3	0.4	118	0	4	0	6.2	1.2
SIA	250	0	1	1.4	0.2	250	0	0	0	4.7	0.0
SLR	244	0	5	1.4	0.0	240	0	6	0	7.2	0.2

	TEMPERATURE					WIND					
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
SQC	45	0	0	1.4	0.2	45	0	0	0	4.4	0.3
SSV	31	0	0	1.5	-0.7	31	0	0	0	5.3	0.2
TAG	26	0	19	1.7	0.8	26	0	23	0	6.2	1.1
TAM	48	15	38	2.9	-0.6	47	0	36	0	18.6	1.3
TAP	367	1	5	1.5	-0.4	226	0	5	0	7.4	0.7
TCX	105	1	1	0.9	0.4	86	0	1	0	5.7	0.9
THA	116	0	3	1.5	0.0	115	0	3	0	5.3	0.6
THT	103	2	31	2.2	0.1	100	0	30	0	7.2	0.6
TSC	254	1	5	1.8	-0.1	205	0	5	0	7.9	1.6
UAL	113902	0	93	0.9	-0.1	113795	0	93	0	4.5	0.2
UPS	1908	0	56	1.4	-0.1	1866	0	56	0	6.7	0.4
USA	56	2	5	1.4	0.2	48	0	2	0	6.3	1.4
VIR	187	1	5	1.6	-0.3	186	0	4	0	8.0	0.2
VRG	141	0	32	2.0	0.5	139	0	100	0	10.1	0.9
VVJ	62	2	26	1.6	0.3	61	0	23	0	7.2	-0.3
VVR	66	0	21	3.1	1.5	63	0	17	0	6.8	0.9
WOA	449	0	5	1.3	0.3	426	0	9	0	8.5	1.5
YSS	177	0	5	1.2	0.7	155	0	7	0	6.2	1.2
AR	1178	0	100	3.1	2.9	1175	0	5	0	5.4	0.5
AU	28619	0	9	1.2	0.4	28622	0	9	0	5.1	0.5
EU	104140	0	23	1.3	0.3	104139	0	23	0	4.7	0.3
KL	3047	0	4	1.3	0.7	3040	0	5	0	6.8	0.4
MK	922	0	100	1.7	1.4	916	0	6	0	6.2	0.8
SA	3280	0	5	1.8	1.2	3180	0	6	0	7.1	0.5
TN	25	0	20	1.5	0.9	25	0	28	0	9.6	1.2
N	986	1	16	2.0	0.6	1007	0	17	0	6.7	1.0
US ACARS	640284	0	61	1.1	0.4	640278	0	60	0	5.2	0.5

TABLE 4B

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Statistics for each airline carrier.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :All hours combined.

Level(s) monitored :1000.0 – 300.1 hPa

Elements monitored :TEMP in °C ; WIND in m s^{-1}

Parameters monitored

:N REP. :Number of observations received excluding duplicates.

:PG :Percentage of observations with gross errors.

:PR :Percentage of observations rejected by quality control including rejections from the duplicate check.

:PC :Percentage of observations with calm winds.

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.

:BIAS :Mean difference of observations from background values excluding those with gross errors in Temperature & Wind Speed.

GROSS ERROR LIMITS :10.0 °C ; 60 m s^{-1} Vector Wind

SELECTION CRITERIA :N REP $\geq$ 20

NB: All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS".

Note for July 2003

Please note that due to operational difficulties associated with the Met Office relocation to Exeter, approximately 1 weeks worth of AMDAR data has not been included, which is reflected in the reduced data volumes compared to other months. This further means that the 24 hour global average number of observations shown in Figures 3a and 3b are incorrect.

		TEMPERATURE						WIND			
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	83	1	39	1.3	-0.5	81	0	37	0	6.1	1.0
AFR	66	2	6	1.1	-0.2	65	0	5	0	5.2	-0.5
AMT	24	0	17	2.1	-0.5	23	0	9	0	9.2	1.1
ANZ	158	0	28	1.3	-0.4	159	0	28	0	5.0	0.0
ATN	38	0	100	4.6	-3.8	36	0	17	0	7.4	1.7
AVN	24	8	54	2.7	-0.4	24	0	50	0	12.2	1.3
AXF	36	0	53	1.5	-0.4	35	0	54	0	9.2	-0.1
AZA	47	0	2	1.2	-0.3	47	0	6	0	7.5	0.2
BAF	24	4	13	2.7	0.8	25	0	0	0	5.9	0.1
BAL	23	9	22	0.9	-0.1	23	0	13	0	4.3	0.0
CFC	51	2	8	2.0	0.1	39	0	3	0	5.9	0.1
CFG	38	0	3	1.7	-0.8	32	0	0	0	6.5	1.0
CKS	44	7	23	1.9	0.9	41	2	17	0	7.9	-0.5
CRL	39	0	0	1.3	0.6	39	0	3	0	9.4	1.1
DAL	147	0	46	1.1	-0.1	146	0	47	0	5.5	0.9
DHL	29	3	100	6.2	-5.9	29	0	100	0	13.9	0.8
DLH	159	0	13	1.6	-0.2	151	0	13	0	5.9	0.8
EIA	40	0	23	2.9	2.1	39	0	100	0	19.1	7.9
FDX	271	0	24	1.2	0.2	268	0	25	0	7.6	0.4
FXI	36	3	33	4.0	2.3	28	4	11	0	10.0	3.5
GAF	40	3	3	0.9	-0.1	39	0	3	0	6.5	0.5
GCO	75	0	7	1.7	0.3	75	0	100	0	10.6	2.6
GTI	27	0	11	2.9	-1.2	29	0	7	0	6.5	-0.1
HAL	50	2	38	1.7	-0.8	49	0	35	0	5.9	1.6
JAL	55	2	4	1.8	0.2	54	0	2	0	8.7	-1.9
JAZ	45	0	4	1.8	1.1	44	0	2	0	6.3	-0.8
KAL	48	2	15	1.3	-0.3	48	0	13	0	5.6	-0.5
KIW	92	2	49	3.3	1.5	88	0	42	0	6.7	0.1
KLM	37	0	0	0.9	0.0	36	0	0	0	4.8	0.6
LAN	24	0	4	1.9	0.7	24	0	0	0	5.3	0.3
MPH	66	0	8	1.7	-0.2	64	0	9	0	7.4	0.9
NCA	45	0	0	1.7	0.3	34	0	3	0	6.5	-1.0
NWA	384	2	5	1.5	0.1	379	0	3	0	6.1	-1.2
NZL	14408	0	54	1.0	0.2	14408	0	54	0	4.3	0.0
OAE	62	0	18	1.6	-0.9	60	0	37	0	17.5	4.6
PAC	26	4	31	1.5	0.0	27	0	26	0	7.1	-0.4
PAL	39	0	13	0.9	-0.4	35	0	17	0	6.4	0.8
QFA	257	1	55	1.5	-0.1	260	0	54	0	5.2	0.7
RRR	66	9	26	2.9	1.4	67	0	12	0	5.9	0.5
SIA	42	0	2	1.0	0.2	42	0	2	0	4.6	1.2
UAL	232604	0	99	1.1	-0.1	232383	0	99	0	4.2	0.4
UPS	134	0	54	1.4	-0.2	131	0	53	0	9.5	1.4
WOA	177	0	10	1.7	0.0	180	0	23	0	13.1	2.5
AR	692	0	100	2.1	1.7	686	0	47	0	4.1	1.1
AU	26894	0	51	1.1	0.3	26894	0	51	0	4.1	0.0
EU	408198	0	67	1.1	0.3	405587	0	66	0	3.7	0.0
KL	2008	0	55	1.4	0.4	1998	0	55	0	4.8	0.1
MK	661	0	100	1.3	0.6	652	0	52	0	4.4	0.3
SA	2158	0	60	1.6	0.6	2086	0	60	0	4.3	0.4
N	31	10	19	2.7	0.9	36	0	8	0	6.4	0.6
US ACARS	1224005	0	78	1.1	0.2	1219623	0	78	0	4.0	0.4

Figure 3a. AIRCRAFT 300 - 150 hPa mean daily count. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 31550

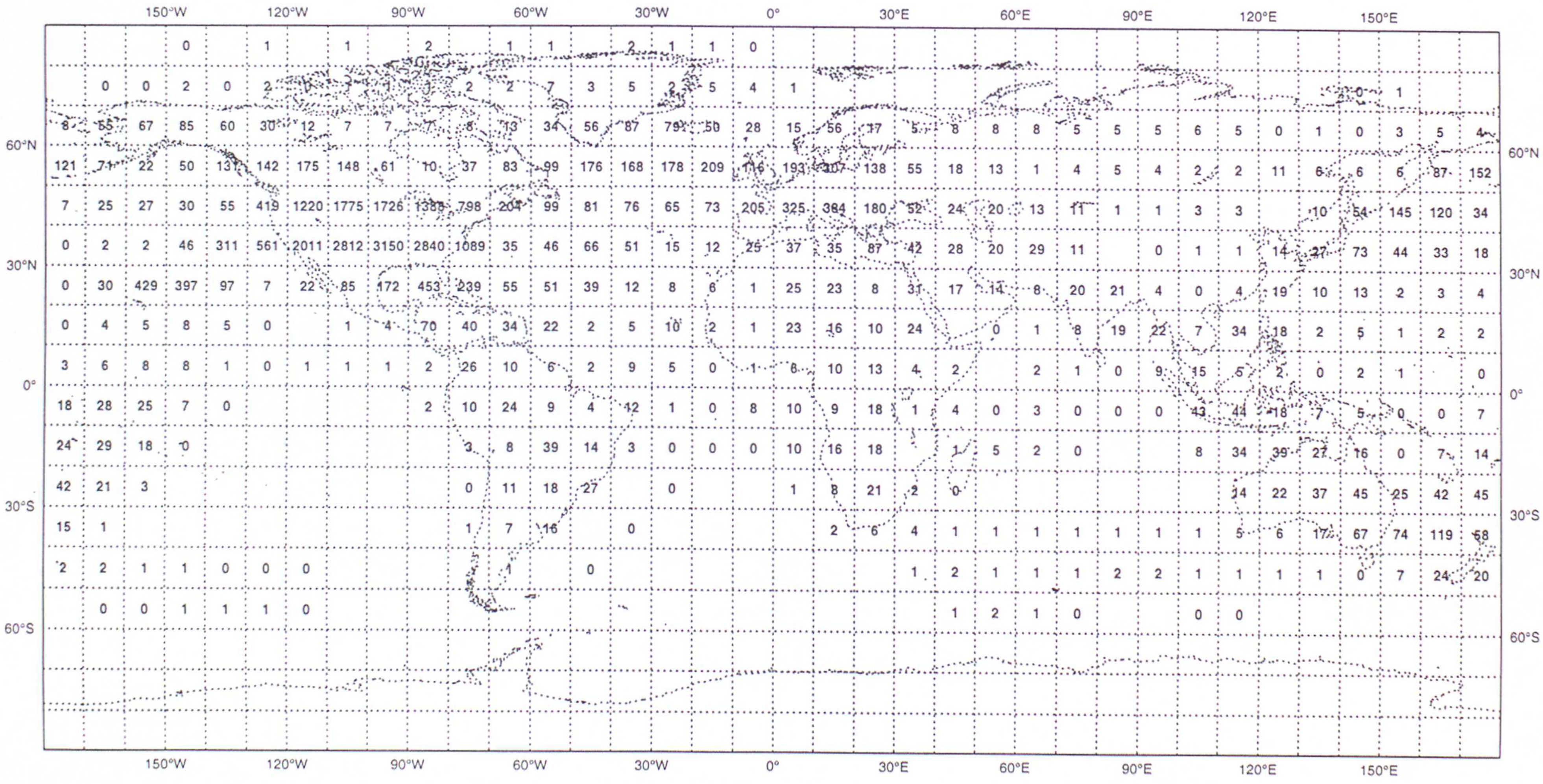

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 3b. AIRCRAFT 1000 - 301 hPa mean daily count. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Global average number of observations in 24 hours = 61540

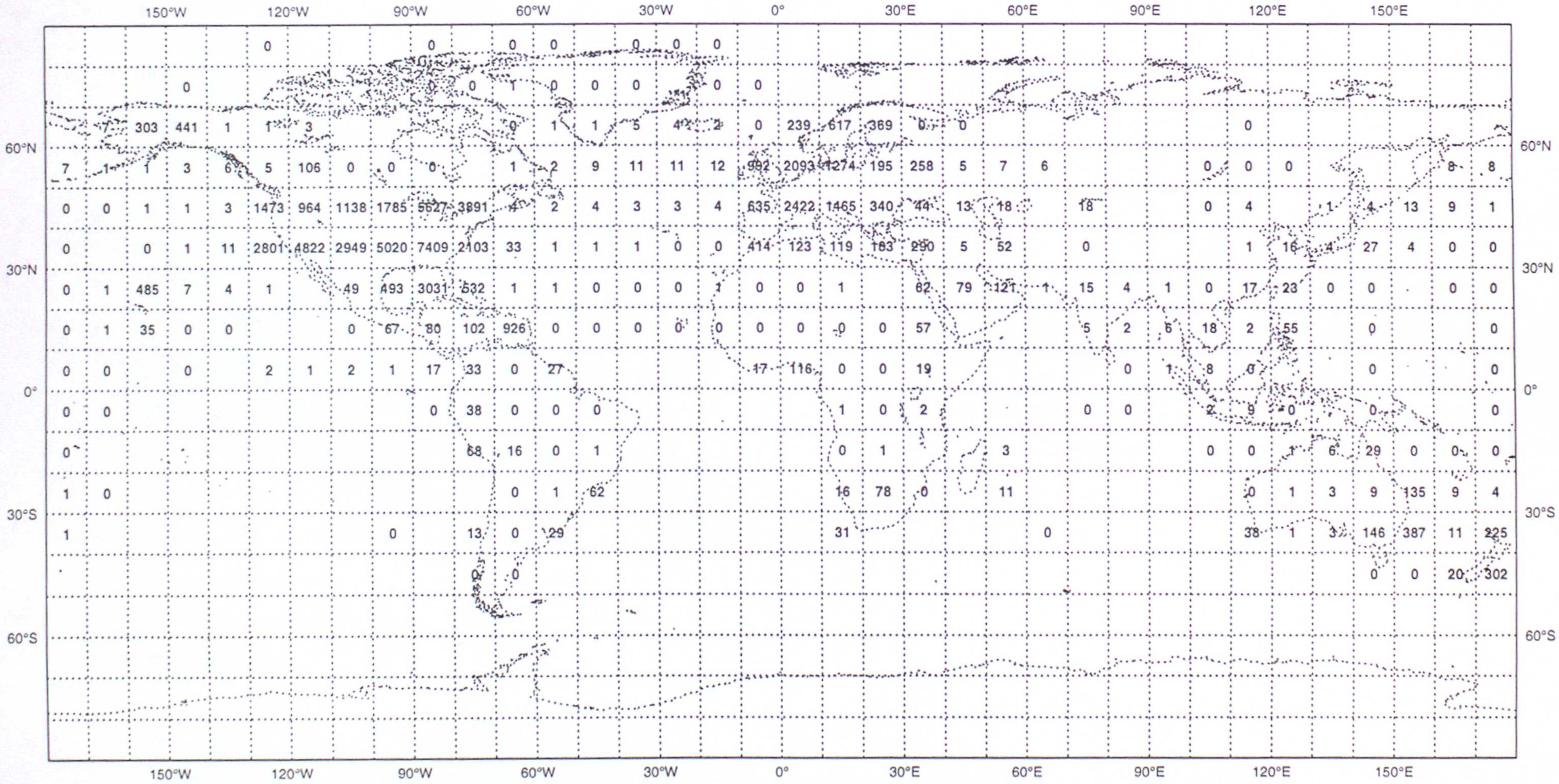

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
0 0 0 0 0 0 0 0
0 0 1 0 0 0 0 0 0
7 303 441 1 1 3 0 1 1 5 4 2 0 239 617 369 0 0 0
7 1 1 3 6 5 106 0 0 0 1 2 9 11 11 12 992 2093 1274 195 258 5 7 6 0 0 0 8 8
0 0 1 1 3 1473 964 1138 1785 5627 3891 4 2 4 3 3 4 635 2422 1465 340 44 13 18 18 0 4 1 4 13 9 1
0 0 1 11 2801 4822 2949 5020 7409 2103 33 1 1 1 0 0 414 123 119 183 290 5 52 0 1 16 4 27 4 0 0
0 1 485 7 4 1 49 493 3031 532 1 1 0 0 0 1 0 0 1 82 79 121 1 15 4 1 0 17 23 0 0 0 0
0 1 35 0 0 0 67 80 102 926 0 0 0 0 0 0 0 0 0 57 5 2 6 18 2 55 0 0
0 0 0 2 1 2 1 17 33 0 27 17 116 0 0 19 0 1 8 0 0 0
0 0 0 38 0 0 0 1 0 2 0 0 2 9 0 0 0
0 68 16 0 1 0 1 3 0 0 1 6 29 0 0 0
1 0 0 1 62 16 78 0 11 0 1 3 9 135 9 4
1 0 13 0 29 31 0 38 1 3 146 387 11 225
0 0 0 0 20 302

Figure 4a. AIRCRAFT 300 - 150 hPa mean winds. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

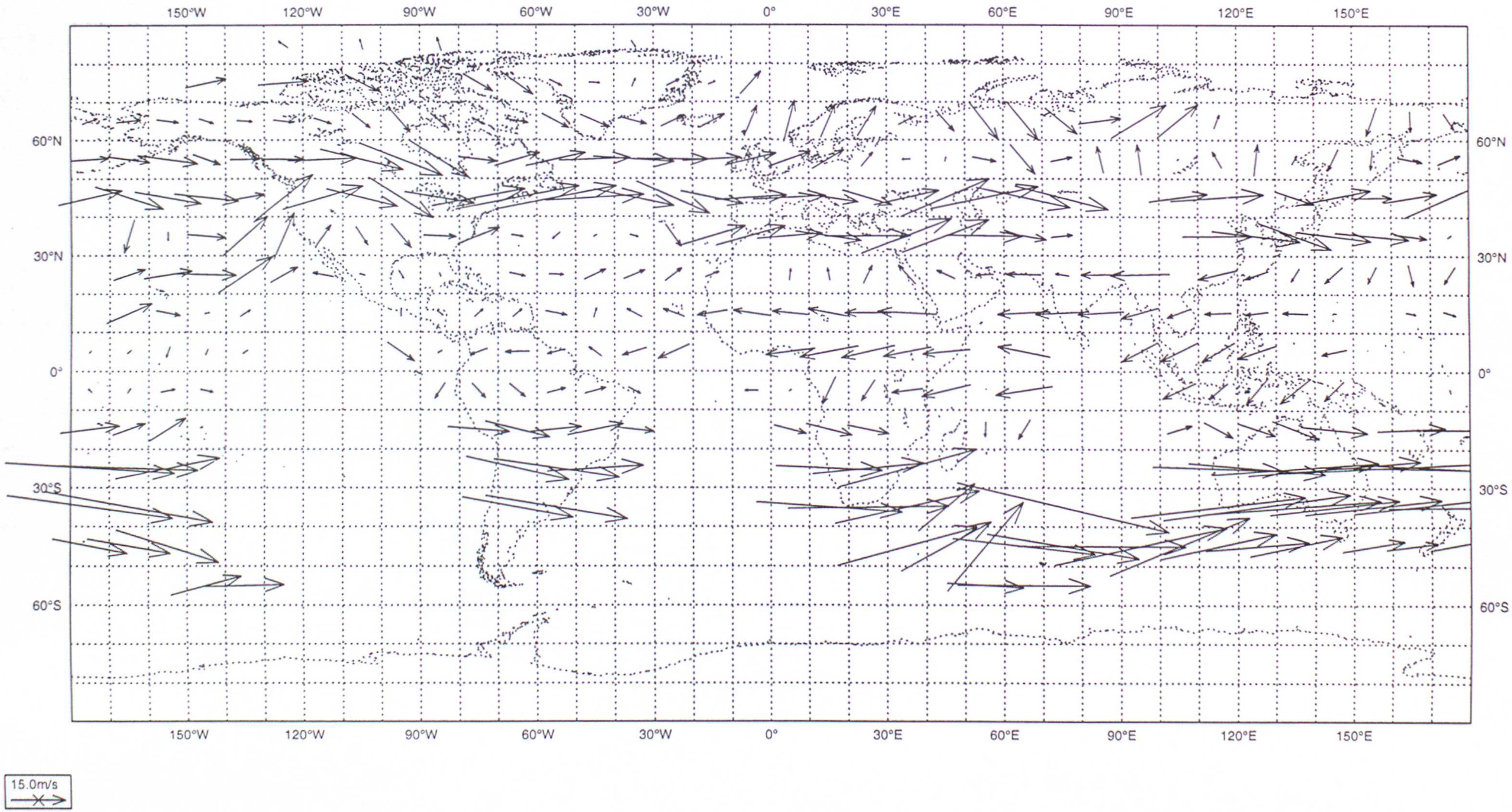

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 4b. AIRCRAFT 1000 - 301 hPa mean winds. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

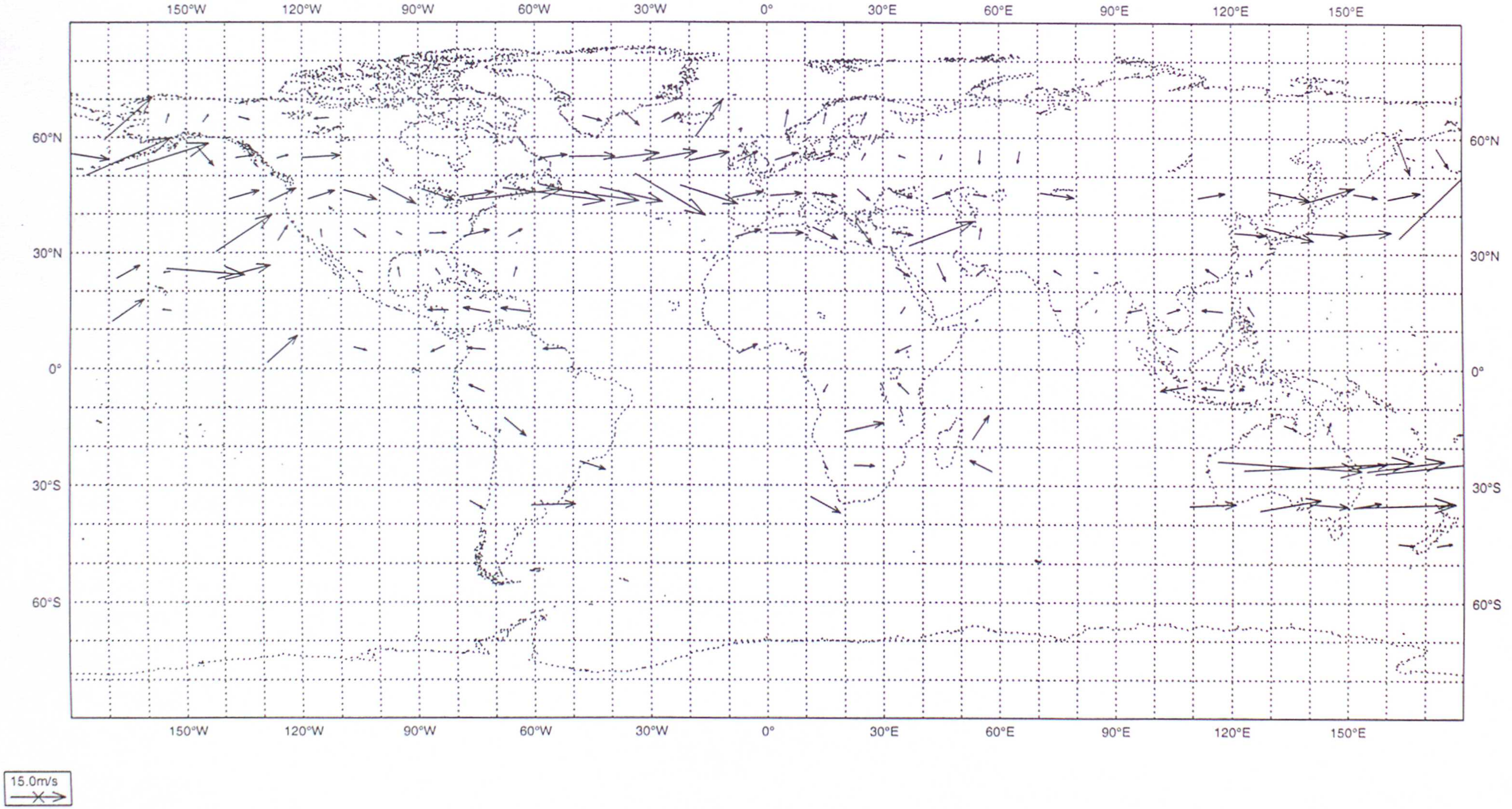

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5a. AIRCRAFT 300 - 150 hPa mean O-B winds. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

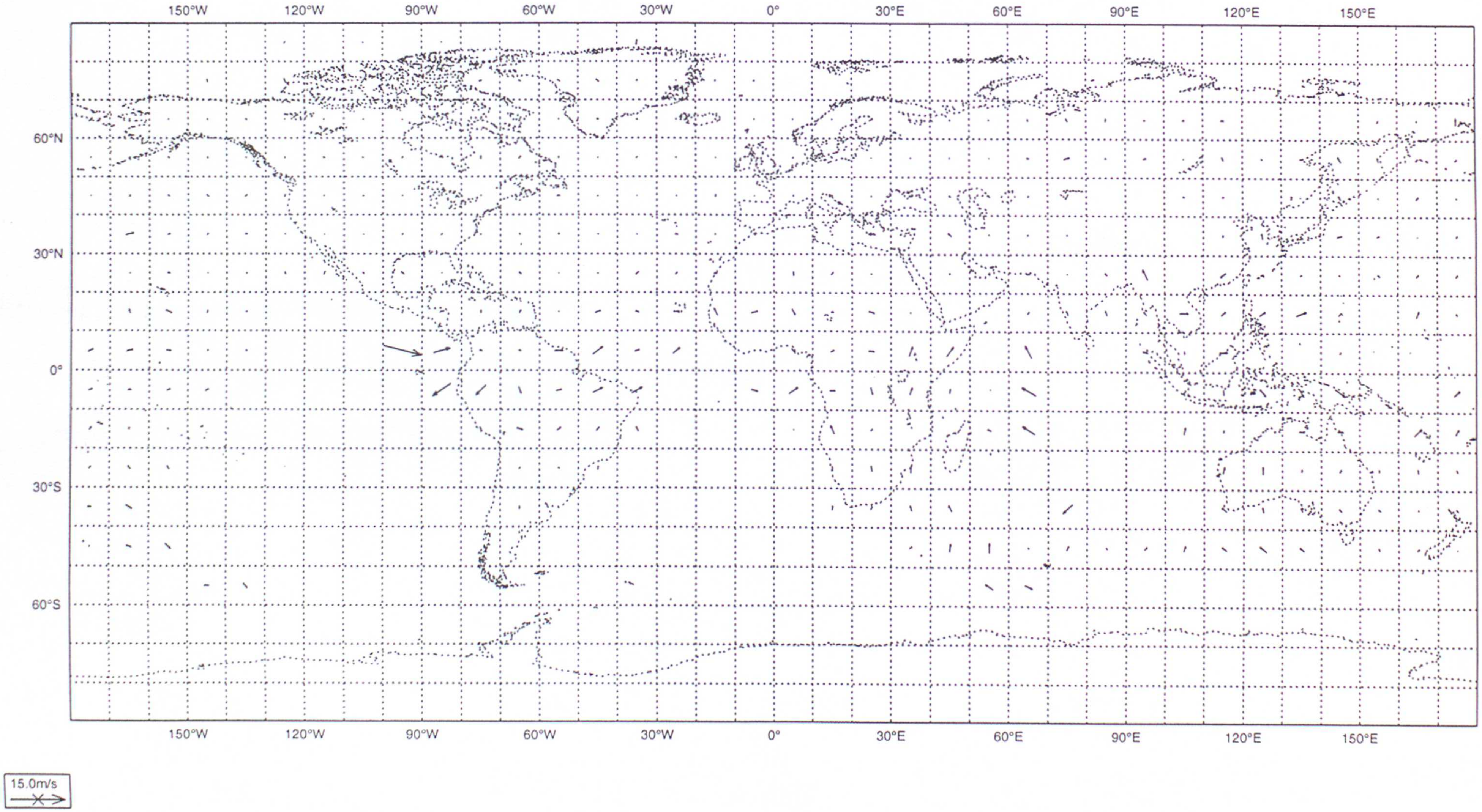

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 5b. AIRCRAFT 1000 - 301 hPa mean O-B winds. JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Arrows are plotted where greater than 30 obs are present

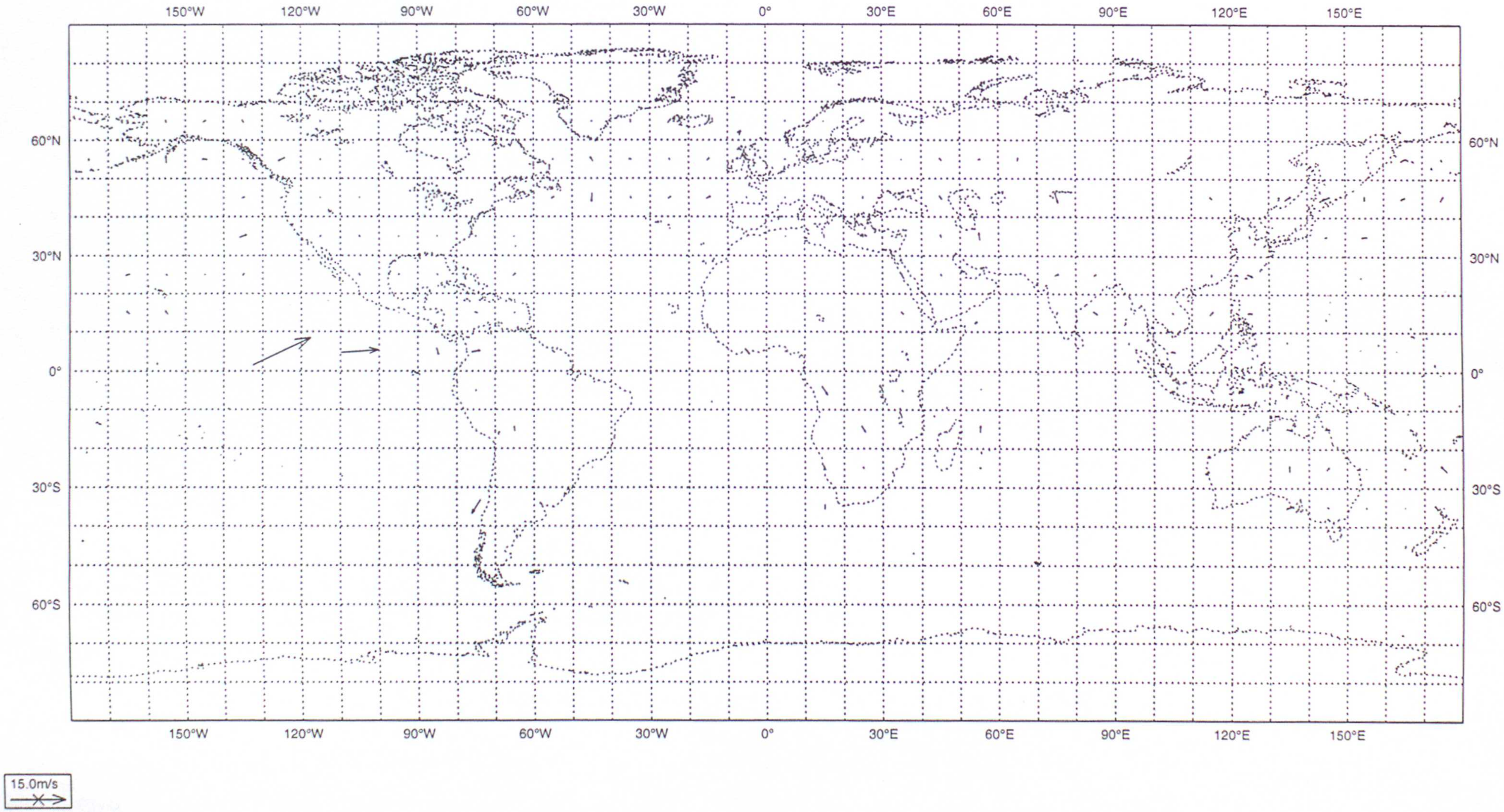

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 6a. AIRCRAFT 300 - 150 hPa mean O-B speeds (ms-1). JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

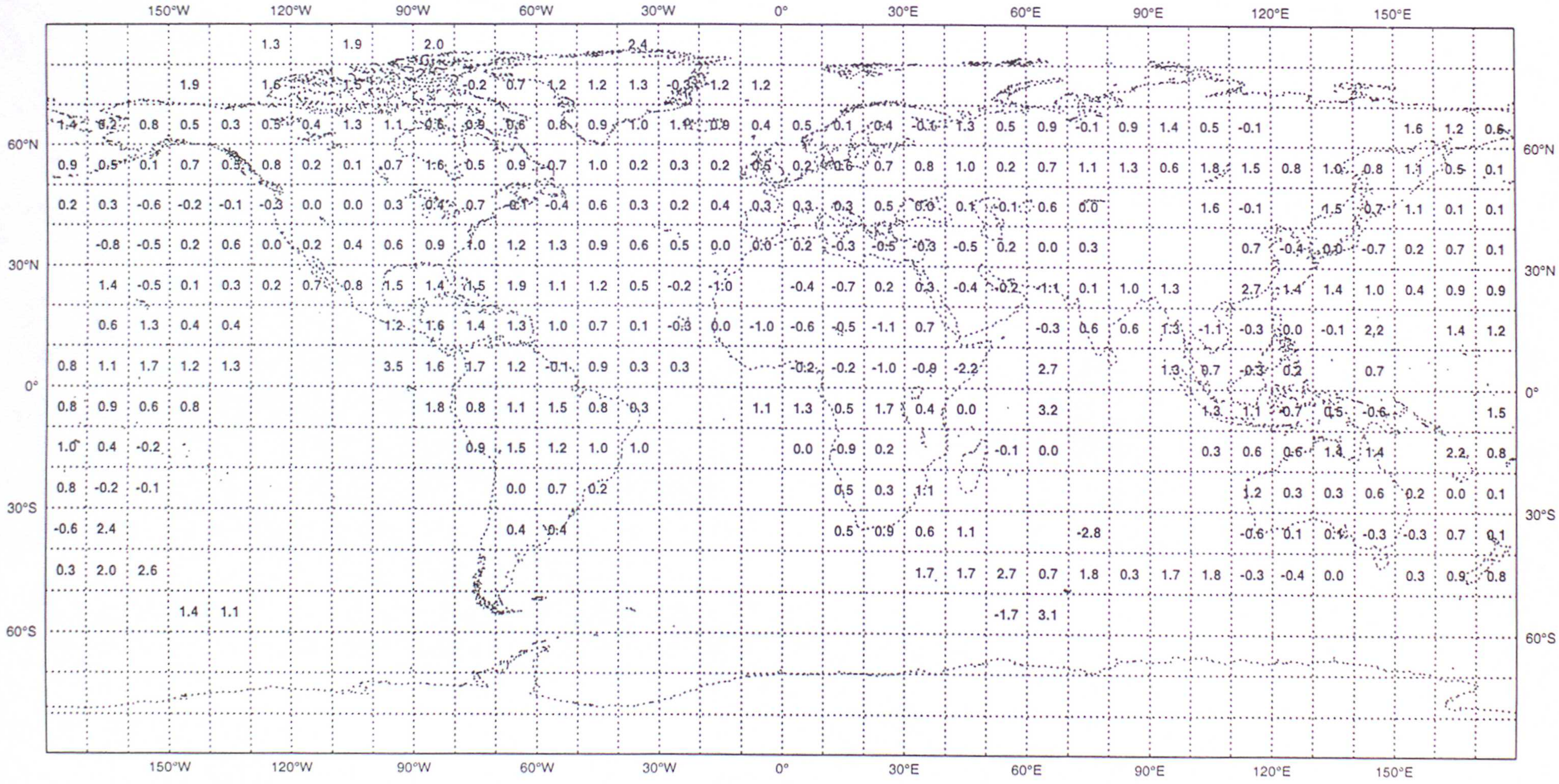

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
1.3 1.9 2.0 2.4
1.9 1.6 -0.2 0.7 1.2 1.2 1.3 -0.3 1.2 1.2
1.4 0.2 0.8 0.5 0.3 0.5 0.4 1.3 1.1 0.6 0.9 0.6 0.8 0.9 1.0 1.9 0.9 0.4 0.5 0.1 0.4 -0.1 1.3 0.5 0.9 -0.1 0.9 1.4 0.5 -0.1 1.6 1.2 0.6
0.9 0.5 0.1 0.7 0.3 0.8 0.2 0.1 0.7 1.6 0.5 0.9 -0.7 1.0 0.2 0.3 0.2 0.5 0.2 0.6 0.7 0.8 1.0 0.2 0.7 1.1 1.3 0.6 1.8 1.5 0.8 1.0 0.8 1.1 0.5 0.1
0.2 0.3 -0.6 -0.2 -0.1 -0.3 0.0 0.0 0.3 0.4 0.7 -0.1 -0.4 0.6 0.3 0.2 0.4 0.3 0.3 0.3 0.5 0.0 0.1 -0.1 0.6 0.0 1.6 -0.1 1.5 0.7 1.1 0.1 0.1
-0.8 -0.5 0.2 0.6 0.0 0.2 0.4 0.6 0.9 1.0 1.2 1.3 0.9 0.6 0.5 0.0 0.0 0.2 -0.3 -0.5 -0.3 -0.5 0.2 0.0 0.3 0.7 -0.4 0.0 -0.7 0.2 0.7 0.1
1.4 -0.5 0.1 0.3 0.2 0.7 -0.8 1.5 1.4 1.5 1.9 1.1 1.2 0.5 -0.2 -1.0 -0.4 -0.7 0.2 0.3 -0.4 -0.2 -1.1 0.1 1.0 1.3 2.7 1.4 1.4 1.0 0.4 0.9 0.9
0.6 1.3 0.4 0.4 1.2 1.6 1.4 1.3 1.0 0.7 0.1 -0.3 0.0 -1.0 -0.6 -0.5 -1.1 0.7 -0.3 0.6 0.6 1.3 -1.1 -0.3 0.0 -0.1 2.2 1.4 1.2
0.8 1.1 1.7 1.2 1.3 3.5 1.6 1.7 1.2 -0.1 0.9 0.3 0.3 -0.2 -0.2 -1.0 -0.9 -2.2 2.7 1.3 0.7 -0.3 0.2 0.7
0.8 0.9 0.6 0.8 1.8 0.8 1.1 1.5 0.8 0.3 1.1 1.3 0.5 1.7 0.4 0.0 3.2 1.3 1.1 -0.7 0.5 -0.6 1.5
1.0 0.4 -0.2 0.9 1.5 1.2 1.0 1.0 0.0 -0.9 0.2 -0.1 0.0 0.3 0.6 0.6 1.4 1.4 2.2 0.8
0.8 -0.2 -0.1 0.0 0.7 0.2 0.5 0.3 1.1 1.2 0.3 0.3 0.6 0.2 0.0 0.1
-0.6 2.4 0.4 0.4 0.5 0.9 0.6 1.1 -2.8 -0.6 0.1 0.1 -0.3 -0.3 0.7 0.1
0.3 2.0 2.6 1.7 1.7 2.7 0.7 1.8 0.3 1.7 1.8 -0.3 -0.4 0.0 0.3 0.9 0.8
1.4 1.1 -1.7 3.1

Figure 6b. AIRCRAFT 1000 - 301 hPa mean O-B speeds (ms-1). JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

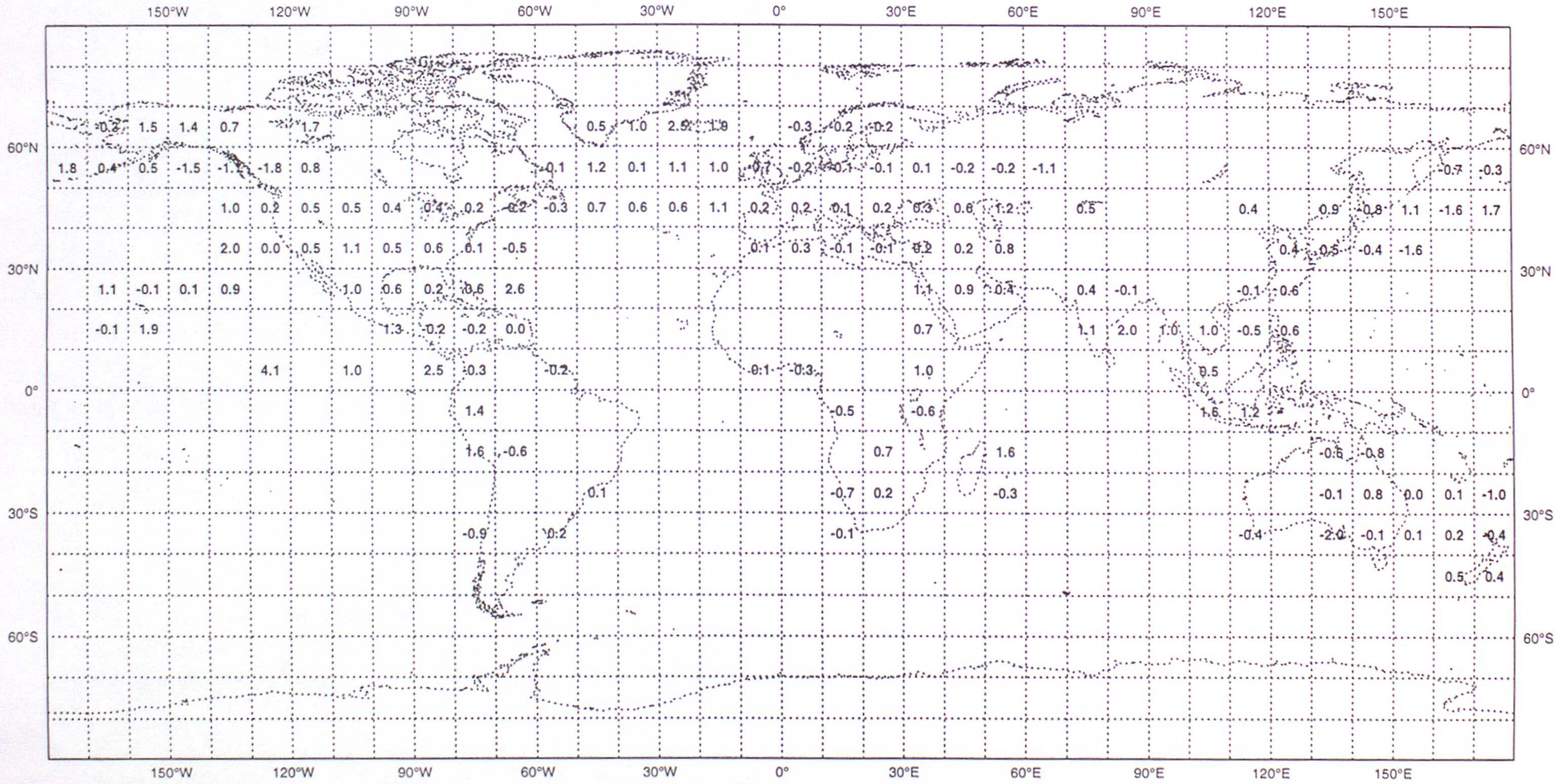

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
-0.2 1.5 1.4 0.7 1.7 0.5 1.0 2.5 1.9 -0.3 -0.2 -0.2
1.8 0.4 0.5 -1.5 -1.2 -1.8 0.8 -0.1 1.2 0.1 1.1 1.0 -0.7 -0.2 -0.1 -0.1 0.1 -0.2 -0.2 -1.1 -0.7 -0.3
1.0 0.2 0.5 0.5 0.4 0.4 0.2 -0.2 -0.3 0.7 0.6 0.6 1.1 0.2 0.2 0.1 0.2 0.3 0.6 1.2 0.5 0.4 0.9 -0.8 1.1 -1.6 1.7
2.0 0.0 0.5 1.1 0.5 0.6 0.1 -0.5 0.1 0.3 -0.1 -0.1 0.2 0.2 0.8 0.4 0.5 -0.4 -1.6
1.1 -0.1 0.1 0.9 1.0 0.6 0.2 0.6 2.6 1.1 0.9 0.4 0.4 -0.1 -0.1 0.6
-0.1 1.9 1.3 -0.2 -0.2 0.0 0.7 1.1 2.0 1.0 1.0 -0.5 0.6
4.1 1.0 2.5 -0.3 -0.2 0.1 -0.3 1.0 0.5
1.4 -0.5 -0.6 1.6 1.2
1.6 -0.6 0.7 1.6 -0.6 -0.8
0.1 -0.7 0.2 -0.3 -0.1 0.8 0.0 0.1 -1.0
-0.9 0.2 -0.1 -0.4 -2.0 -0.1 0.1 0.2 -0.4
0.5 0.4

Figure 7a. AIRCRAFT 300 - 150 hPa RMS O-B vector (ms-1). JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

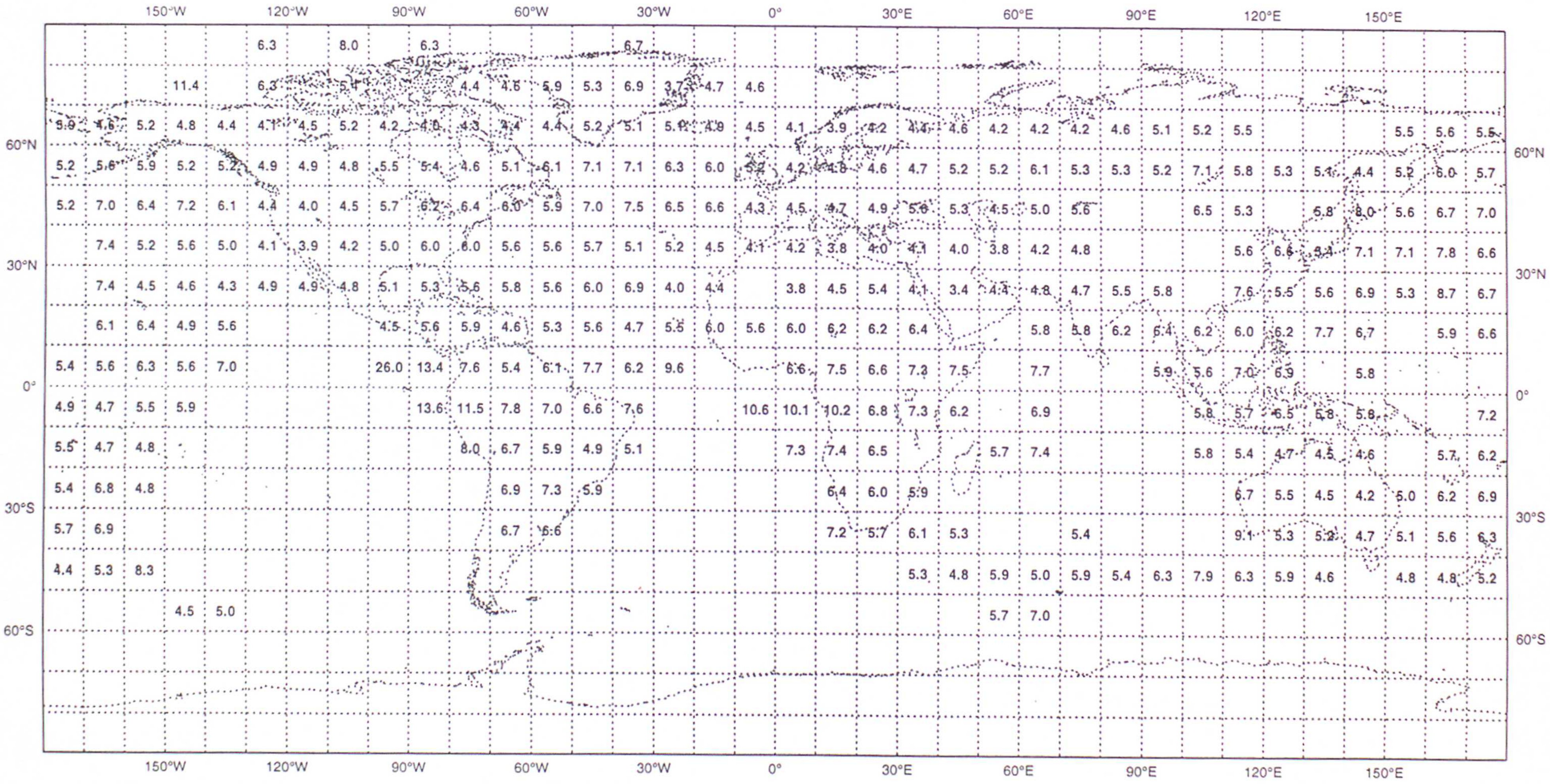

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
6.3 8.0 6.3 6.7
11.4 6.3 5.4 4.4 4.6 5.9 5.3 6.9 3.7 4.7 4.6
5.9 4.6 5.2 4.8 4.4 4.1 4.5 5.2 4.2 4.0 4.3 4.4 4.4 5.2 5.1 5.1 4.9 4.5 4.1 3.9 4.2 4.4 4.6 4.2 4.2 4.2 4.6 5.1 5.2 5.5 5.5 5.6 5.5
5.2 5.6 5.9 5.2 5.2 4.9 4.9 4.8 5.5 5.4 4.6 5.1 6.1 7.1 7.1 6.3 6.0 5.2 4.2 4.8 4.6 4.7 5.2 5.2 6.1 5.3 5.3 5.2 7.1 5.8 5.3 5.4 4.4 5.2 6.0 5.7
5.2 7.0 6.4 7.2 6.1 4.4 4.0 4.5 5.7 6.2 6.4 6.0 5.9 7.0 7.5 6.5 6.6 4.3 4.5 4.7 4.9 5.6 5.3 4.5 5.0 5.6 6.5 5.3 5.8 8.0 5.6 6.7 7.0
7.4 5.2 5.6 5.0 4.1 3.9 4.2 5.0 6.0 6.0 5.6 5.6 5.7 5.1 5.2 4.5 4.1 4.2 3.8 4.0 4.1 4.0 3.8 4.2 4.8 5.6 6.6 8.4 7.1 7.1 7.8 6.6
7.4 4.5 4.6 4.3 4.9 4.9 4.8 5.1 5.3 5.6 5.8 5.6 6.0 6.9 4.0 4.4 3.8 4.5 5.4 4.1 3.4 4.4 4.8 4.7 5.5 5.8 7.6 5.5 5.6 6.9 5.3 8.7 6.7
6.1 6.4 4.9 5.6 4.5 5.6 5.9 4.6 5.3 5.6 4.7 5.5 6.0 5.6 6.0 6.2 6.2 6.4 5.8 5.8 6.2 6.4 6.2 6.0 6.2 7.7 6.7 5.9 6.6
5.4 5.6 6.3 5.6 7.0 26.0 13.4 7.6 5.4 6.1 7.7 6.2 9.6 6.6 7.5 6.6 7.3 7.5 7.7 5.9 5.6 7.0 6.9 5.8
4.9 4.7 5.5 5.9 13.6 11.5 7.8 7.0 6.6 7.6 10.6 10.1 10.2 6.8 7.3 6.2 6.9 5.8 5.7 6.5 6.8 5.8 7.2
5.5 4.7 4.8 8.0 6.7 5.9 4.9 5.1 7.3 7.4 6.5 5.7 7.4 5.8 5.4 4.7 4.5 4.6 5.7 6.2
5.4 6.8 4.8 6.9 7.3 5.9 6.4 6.0 5.9 6.7 5.5 4.5 4.2 5.0 6.2 6.9
5.7 6.9 6.7 6.6 7.2 5.7 6.1 5.3 5.4 9.1 5.3 5.2 4.7 5.1 5.6 6.3
4.4 5.3 8.3 5.3 4.8 5.9 5.0 5.9 5.4 6.3 7.9 6.3 5.9 4.6 4.8 4.8 5.2
4.5 5.0 5.7 7.0

Figure 7b. AIRCRAFT 1000 - 301 hPa RMS O-B vector (ms-1). JULY 2003
Observations with O-B vector difference greater than 60 ms-1 excluded
Values are printed where greater than 30 obs are present

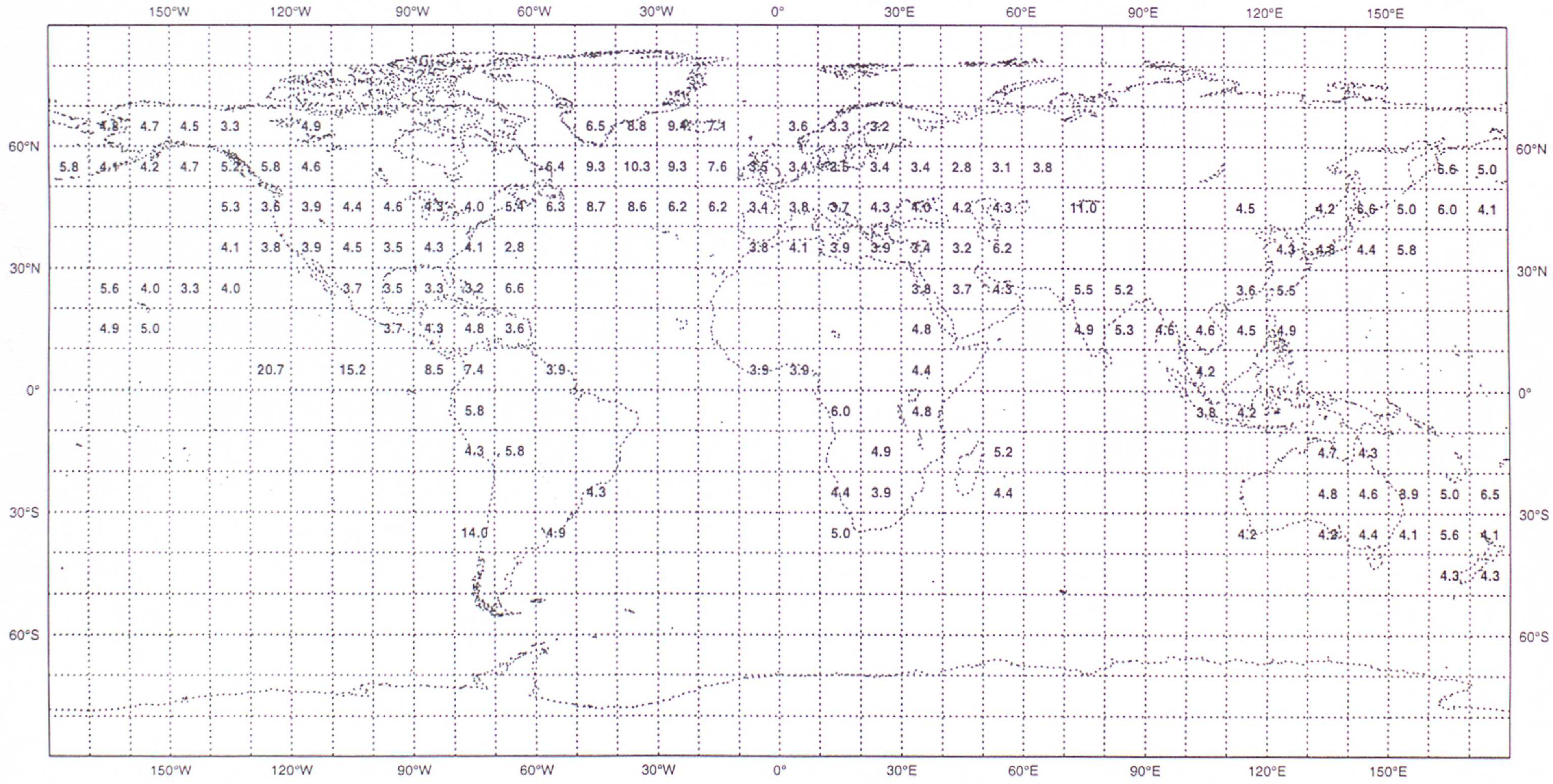

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.8 4.7 4.5 3.3 4.9 6.5 8.8 9.4 7.1 3.6 3.3 3.2
5.8 4.1 4.2 4.7 5.2 5.8 4.6 6.4 9.3 10.3 9.3 7.6 3.5 3.4 2.5 3.4 3.4 2.8 3.1 3.8 6.6 5.0
5.3 3.6 3.9 4.4 4.6 4.3 4.0 5.4 6.3 8.7 8.6 6.2 6.2 3.4 3.8 3.7 4.3 4.0 4.2 4.3 11.0 4.5 4.2 6.6 5.0 6.0 4.1
4.1 3.8 3.9 4.5 3.5 4.3 4.1 2.8 3.8 4.1 3.9 3.9 3.4 3.2 6.2 4.3 4.8 4.4 5.8
5.6 4.0 3.3 4.0 3.7 3.5 3.3 3.2 6.6 3.8 3.7 4.5 5.5 5.2 3.6 5.5
4.9 5.0 3.7 4.3 4.8 3.6 4.8 4.9 5.3 4.6 4.6 4.5 4.9
20.7 15.2 8.5 7.4 3.9 3.9 3.9 4.4 4.2
5.8 6.0 4.8 3.8 4.2
4.3 5.8 4.9 5.2 4.7 4.3
4.3 4.4 3.9 4.4 4.8 4.6 8.9 5.0 6.5
14.0 4.9 5.0 4.2 4.2 4.4 4.1 5.6 4.1
4.3 4.3

TABLE 5

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 1000.0 - 30.0 hPa
Element monitored		:GEOPOTENTIAL HEIGHT IN metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:% REJ	:Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.
	:NUM LEVELS	:Number of levels satisfying selection criteria.
GROSS ERROR LIMITS	:Defined in Appendix I.1	
SELECTION CRITERIA	: ≥3 levels with ≥10 observations and ≥ 100 m weighted RMS.	

ONLY THE WORST LEVEL IS SHOWN WITH UNWEIGHTED RMS

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	SD	BIAS	RMS	NUM LEVELS
KHRH	00	Z	500	48/ -12	10	3	73.7	-39.2	83.5	7
KHRH	12	Z	300	48/ -12	10	0	73.9	-92.0	118.0	7
28722	12	Z	1000	55/ 56	25	2	38.5	-36.1	52.8	6
42027	12	Z	70	34/ 75	11	0	152.9	118.5	193.5	4
42101	00	Z	300	30/ 76	17	0	67.7	-46.5	82.1	8
42101	12	Z	70	30/ 76	17	0	138.5	100.9	171.3	4
42182	00	Z	50	29/ 77	10	0	151.0	97.4	179.7	7
42339	00	Z	500	26/ 73	22	0	61.0	-7.2	61.4	7
42339	12	Z	70	26/ 73	10	0	49.4	180.9	187.5	4
42361	00	Z	100	26/ 78	10	0	133.4	-61.3	146.8	8
42361	12	Z	100	26/ 78	11	1	134.5	22.6	136.4	6
42369	00	Z	50	27/ 81	11	1	118.5	203.2	235.2	10
42369	12	Z	1000	27/ 81	1	24	0.0	-99.0	99.0	12
42379	00	Z	300	27/ 83	16	0	49.0	-77.6	91.8	6
42379	12	Z	300	27/ 83	10	0	38.0	-99.8	106.8	4
42397	00	Z	70	27/ 88	9	1	98.8	82.3	128.6	4
42397	12	Z	70	27/ 88	15	1	135.0	156.7	206.8	9
42492	00	Z	1000	26/ 85	23	3	16.4	-69.6	71.5	6
42492	12	Z	1000	26/ 85	20	4	15.2	-77.0	78.5	5
42647	00	Z	1000	23/ 73	22	0	15.3	-58.9	60.8	5
42647	12	Z	1000	23/ 73	26	0	14.7	-71.4	72.9	8
42701	00	Z	150	23/ 85	21	0	119.8	9.7	120.2	7
42701	12	Z	150	23/ 85	15	0	115.5	-3.2	115.5	8
42724	00	Z	100	24/ 91	13	1	132.4	60.4	145.5	5
42809	00	Z	70	23/ 88	14	1	89.8	177.1	198.6	7
42809	12	Z	70	23/ 88	23	1	99.2	146.2	176.7	9
42867	12	Z	150	21/ 79	9	1	106.1	-6.0	106.3	5
43003	00	Z	1000	19/ 73	2	27	0.0	-96.0	96.0	5
43003	12	Z	1000	19/ 73	3	27	4.3	-94.0	94.1	7
43014	00	Z	400	20/ 75	23	0	65.8	60.0	89.0	7
43014	12	Z	200	20/ 75	22	2	103.2	49.9	114.7	7
43150	00	Z	400	18/ 83	28	0	60.4	-14.1	62.1	7
43185	12	Z	150	16/ 81	13	0	96.3	-33.2	101.8	4
43192	00	Z	100	15/ 74	12	0	110.2	-103.3	151.0	6
43192	12	Z	70	15/ 74	16	0	114.9	82.4	141.4	7
43295	12	Z	200	13/ 78	14	1	72.1	-52.1	89.0	5
43311	00	Z	200	11/ 73	21	0	63.4	-87.4	108.0	4
43346	00	Z	400	11/ 80	20	0	61.8	-3.5	61.9	10
43346	12	Z	70	11/ 80	18	0	72.1	129.3	148.0	5
43353	00	Z	1000	10/ 76	14	8	6.6	-93.6	93.8	4
43369	00	Z	100	8/ 73	15	0	138.8	104.7	173.9	8
43369	12	Z	100	8/ 73	9	3	75.8	189.0	203.6	7
43371	00	Z	200	8/ 77	23	2	58.8	-88.9	106.5	7
43371	12	Z	70	8/ 77	10	1	77.4	179.2	195.2	6
58968	00	Z	1000	25/ 122	16	13	8.1	-90.0	90.4	4
61902	12	Z	1000	-8/ -14	18	0	31.4	30.0	43.4	7
83746	00	Z	1000	-23/ -43	24	4	28.6	-41.2	50.2	4
97180	00	Z	300	-5/ 120	10	1	85.7	-65.9	108.1	6

Figure 8. TEMP 500 hPa geopotential mean daily count. JULY 2003
All hours
Global average number of observations in 24 hours = 1170

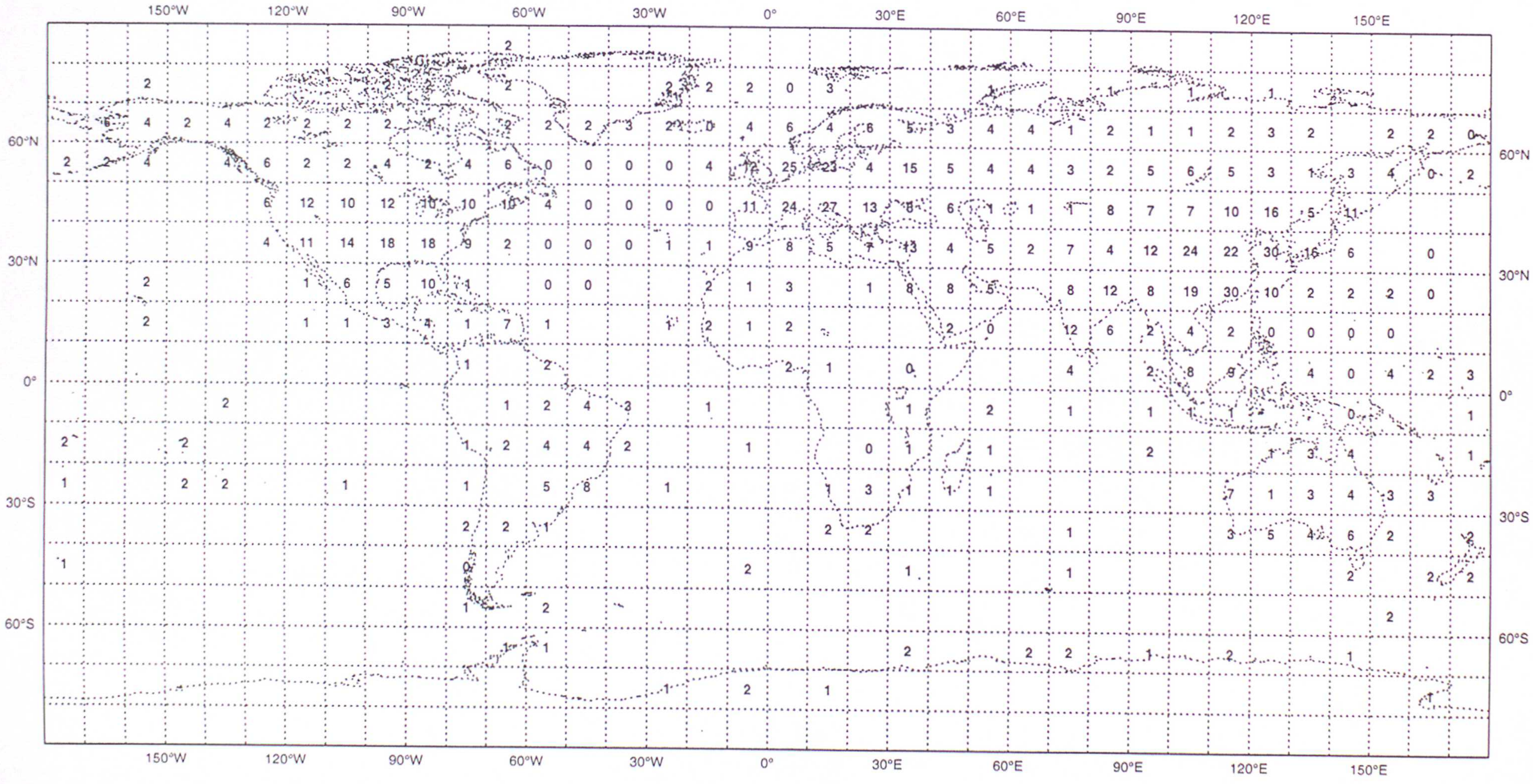

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 6

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for radiosonde TEMPs.

Area monitored :90°N - 90°S, 180°W - 180°E.

Standard of comparison :Background field from UKMO global model.

Observation times :00 UTC and 12 UTC.

Level(s) monitored :Standard levels between 1000.0 - 100.0 hPa

Element monitored :VECTOR WIND in m s^{-1}

Parameters monitored

:NUM OBS :Number of observations available at level shown during period.

:NUM GROSS :Number of gross errors at level shown during period.

:% REJ :Percentage of observations rejected by quality control at level shown during period excluding those with gross errors.

:UBIAS,VBIAS :Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.

:RMS :Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

:NUM LEVELS :Number of levels satisfying selection criteria.

GROSS ERROR LIMITS :Defined in Appendix I.2

SELECTION CRITERIA : $\geq$ 10 observations and $\geq$ 15 m s^{-1} RMS vector wind.

ONLY THE STANDARD LEVEL BETWEEN 1000 - 100 hPa WITH HIGHEST RMS IS SHOWN

WMO IDENT	OBS TIME	ELM	LEV	LAT/LONG	NUM OBS	NUM GROSS	% REJ	UBIAS	VBIAS	RMS	LEVELS
PSPIU	00	V	200	-5/ -81	9	0	100	-5.8	-2.4	15.9	1
40706	00	V	400	38/ 46	21	0	100	1.7	-3.3	16.7	1
42027	12	V	300	34/ 75	17	1	100	0.3	5.0	15.5	1
43192	00	V	150	15/ 74	16	0	81	-1.6	4.8	17.4	1
43371	00	V	100	8/ 77	15	0	40	11.5	3.0	17.0	1
43371	12	V	100	8/ 77	12	0	25	13.4	2.0	23.6	1
48455	00	V	100	14/ 101	28	0	82	3.0	-10.3	15.9	1
60360	12	V	100	37/ 8	10	1	100	14.7	-2.2	19.0	1
60559	12	V	250	33/ 7	10	0	100	-8.5	0.1	15.3	1
61995	00	V	150	-20/ 58	21	0	4	-5.2	-2.2	24.7	1
63741	00	V	100	-1/ 37	28	0	39	15.1	0.9	18.5	2
63985	00	V	100	-5/ 55	26	0	23	12.5	1.5	18.3	1
63985	12	V	100	-5/ 55	26	0	19	12.4	2.4	19.5	2
64458	12	V	150	2/ 16	16	1	100	10.8	-0.7	19.3	1
64500	12	V	150	0/ 9	22	0	100	13.0	-0.3	18.1	1
68174	12	V	200	-24/ 29	16	0	100	-11.5	2.8	16.4	1
68263	12	V	300	-26/ 28	18	0	33	-11.8	-3.5	27.1	3
68424	12	V	300	-28/ 21	10	0	100	-11.8	3.5	16.6	1
68442	12	V	250	-29/ 26	20	1	100	-27.7	-2.1	31.8	4
68461	12	V	200	-28/ 28	10	0	100	-14.8	0.0	20.3	3
68512	12	V	200	-30/ 18	19	0	100	-16.7	2.8	25.3	5
68816	12	V	250	-34/ 19	11	0	9	-9.6	-3.3	15.5	1
68842	12	V	250	-34/ 26	12	0	16	-12.4	-3.3	18.2	2

Figure 9. TEMP/PILOT 300 hPa wind mean daily count. JULY 2003
All hours
Global average number of observations in 24 hours = 1369

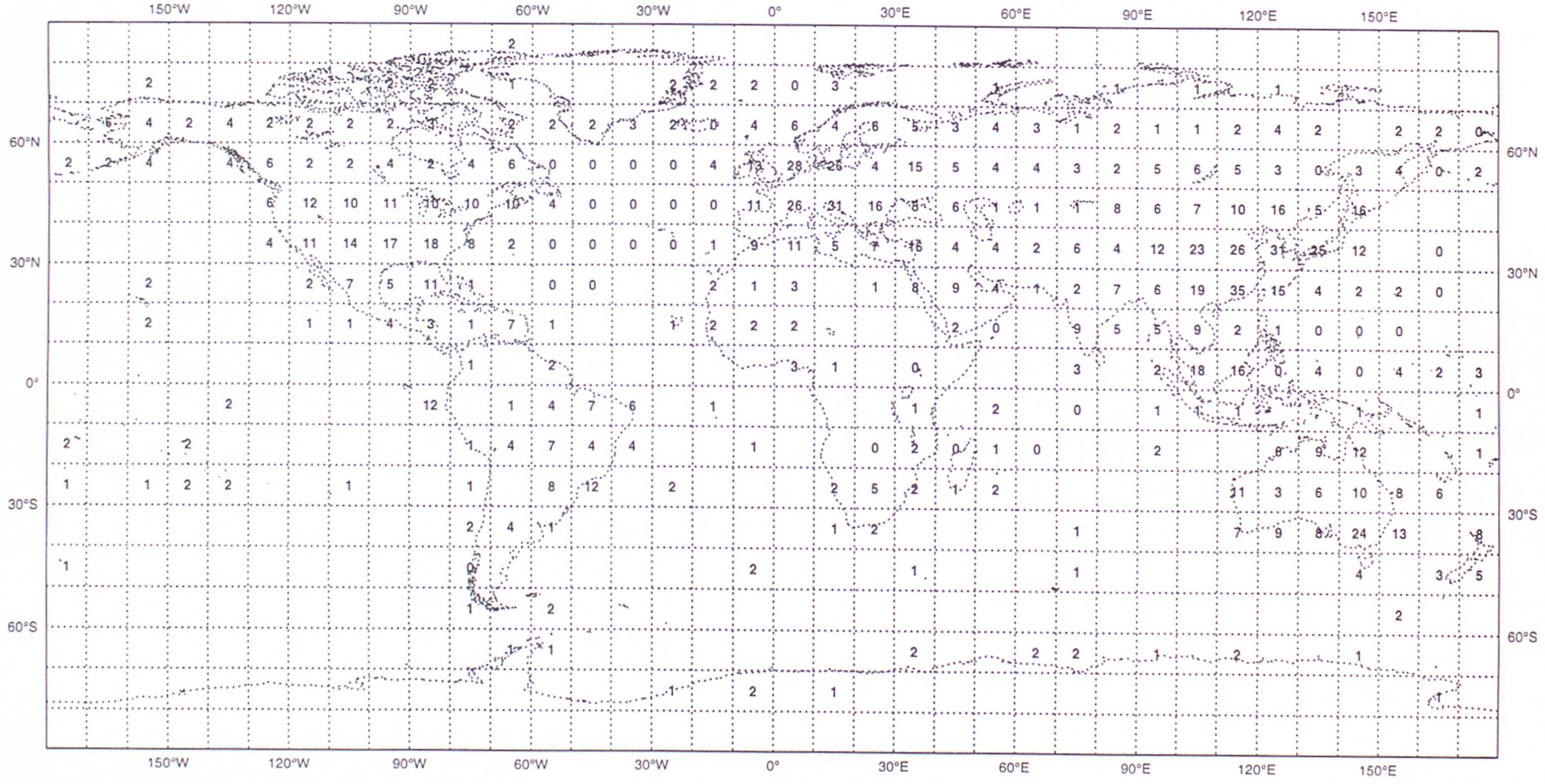

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 7

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures		
Period		:One calendar month.
Data monitored		:Reports from each unique identifier for radiosonde TEMPs.
Area monitored		:90°N - 90°S, 180°W - 180°E.
Standard of comparison		:Background field from UKMO global model.
Observation times		:00 UTC and 12 UTC.
Level(s) monitored		:Standard levels between 500.0 - 150.0 hPa
Element monitored		:WIND DIRECTION in degrees
Parameters monitored		
	:NUM OBS	:Average number of observations at all levels.
	:BIAS	:Mean difference of observations from background values from all levels.
	:MAX SPREAD	:(For observation - background values) Maximum absolute difference of SD at any level from SD at all levels
	:SD	:SD of difference of observations from background values at all levels.
SELECTION CRITERIA	:NUM OBS ≥ 5, and ABSOLUTE BIAS ≥ 10°, with SD < 30°, and MAX SPREAD < 10°	

WMO IDENT	OBS TIME	ELM	LAT/LONG	NUM OBS	BIAS	MAX SPREAD	SD
40948	12	DD	35/ 69	26	-21.3	7.0	18.1
42809	00	DD	23/ 88	18	13.6	8.8	24.6
42809	12	DD	23/ 88	20	13.2	5.8	16.7
43333	00	DD	12/ 93	11	18.9	5.9	23.2
43333	12	DD	12/ 93	15	13.3	4.2	19.7
47981	00	DD	25/ 141	5	10.3	7.1	14.1
48568	00	DD	7/ 101	19	14.7	7.5	24.7
62337	00	DD	31/ 34	25	-20.8	1.5	10.0
63450	12	DD	9/ 39	5	12.1	7.5	15.6

MONITORING OF SATELLITE WINDS

MONITORING CENTRE: BRACKNELL

MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from GOES-8, GOES-10, METEOSAT-5, METEOSAT-7, GMS-5, INSAT.

Standard of comparison :Background field from UKMO global model.

Selection Criteria :number of observations > 10.

Data Extracted :Layer 701 - 1000 hPa
401 - 700 hPa
101 - 400 hPa

:Mean wind

:Mean observation minus background vector wind differences

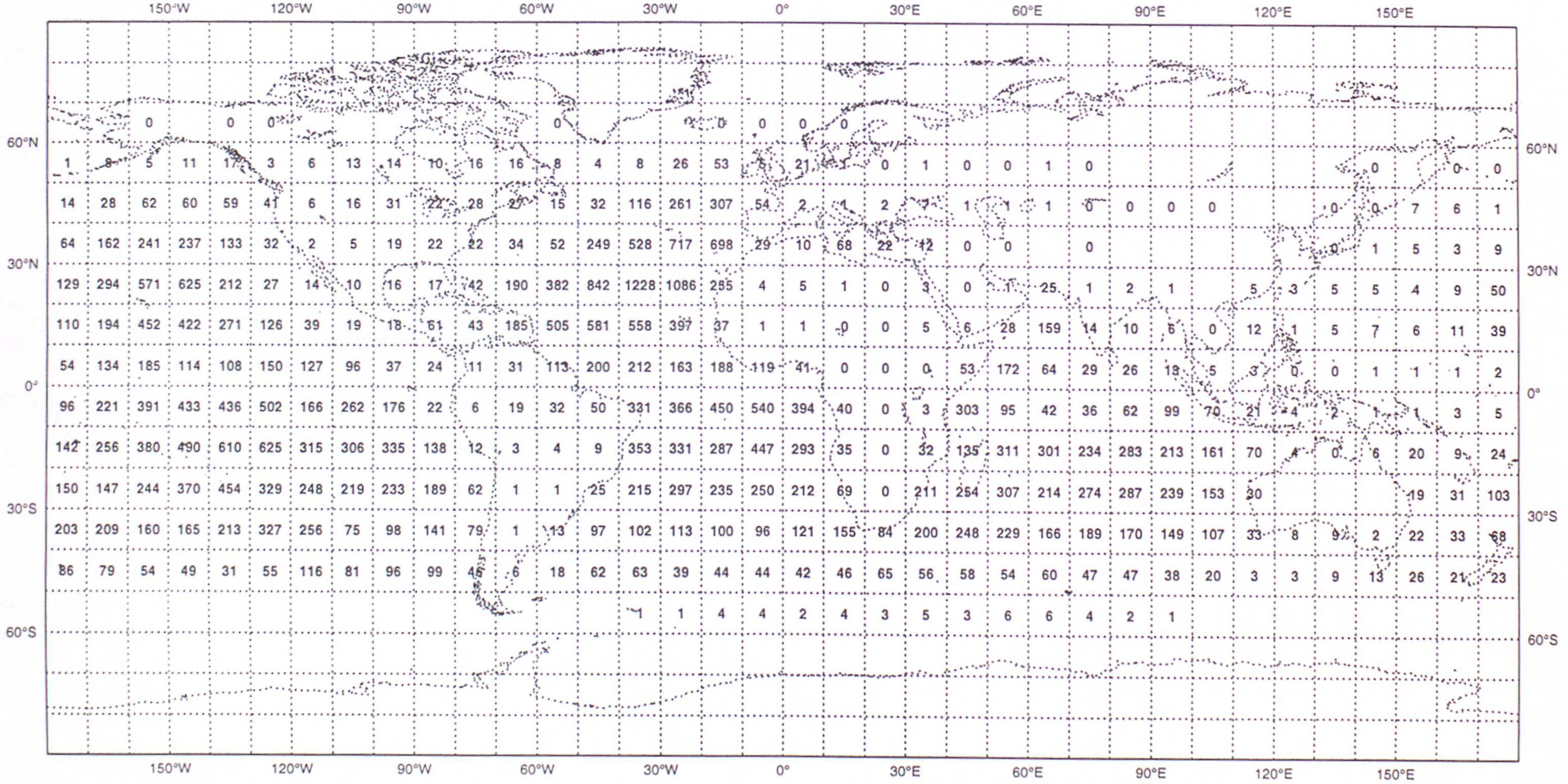
:Mean observation minus background speed differences

:RMS of observation minus background vector differences

Note for July 2003

Please note that due to operational difficulties associated with the Met Office relocation to Exeter, approximately 2 weeks worth of SATWIND data has not been included, which is reflected in the reduced data volumes compared to other months. This further means that the 24 hour global average number of observations shown in the following SATWIND figures are incorrect.

Figure 10. SATOB 701 - 1000 hPa mean daily count. JULY 2003
Global average number of observations in 24 hours = 42814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60°N 30°N 0° 30°S 60°S
0 0 0 0 0 0 0 0
1 8 5 11 17 3 6 13 14 10 16 16 8 4 8 26 53 5 21 1 0 1 0 0 1 0 0 0 0
14 28 62 60 59 41 6 16 31 22 28 27 15 32 116 261 307 54 2 1 2 7 1 1 1 0 0 0 0 0 0 7 6 1
64 162 241 237 133 32 2 5 19 22 22 34 52 249 528 717 698 29 10 68 22 12 0 0 0 0 1 5 3 9
129 294 571 625 212 27 14 10 16 17 42 190 382 842 1228 1086 255 4 5 1 0 3 0 1 25 1 2 1 5 3 5 5 4 9 50
110 194 452 422 271 126 39 19 18 61 43 185 505 581 558 397 37 1 1 0 0 5 6 28 159 14 10 6 0 12 1 5 7 6 11 39
54 134 185 114 108 150 127 96 37 24 11 31 113 200 212 163 188 119 41 0 0 0 53 172 64 29 26 13 5 3 0 0 1 1 1 2
96 221 391 433 436 502 166 262 176 22 6 19 32 50 331 366 450 540 394 40 0 3 303 95 42 36 62 99 70 21 4 2 1 1 3 5
142 256 380 490 610 625 315 306 335 138 12 3 4 9 353 331 287 447 293 35 0 32 135 311 301 234 283 213 161 70 4 0 6 20 9 24
150 147 244 370 454 329 248 219 233 189 62 1 1 25 215 297 235 250 212 69 0 211 254 307 214 274 287 239 153 30 19 31 103
203 209 160 165 213 327 256 75 98 141 79 1 13 97 102 113 100 96 121 155 84 200 248 229 166 189 170 149 107 33 8 9 2 22 33 68
86 79 54 49 31 55 116 81 96 99 46 6 18 62 63 39 44 44 42 46 65 56 58 54 60 47 47 38 20 3 3 9 13 26 21 23
1 1 4 4 2 4 3 5 3 6 6 4 2 1

Figure 11. SATOB 701 - 1000 hPa vector mean wind. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

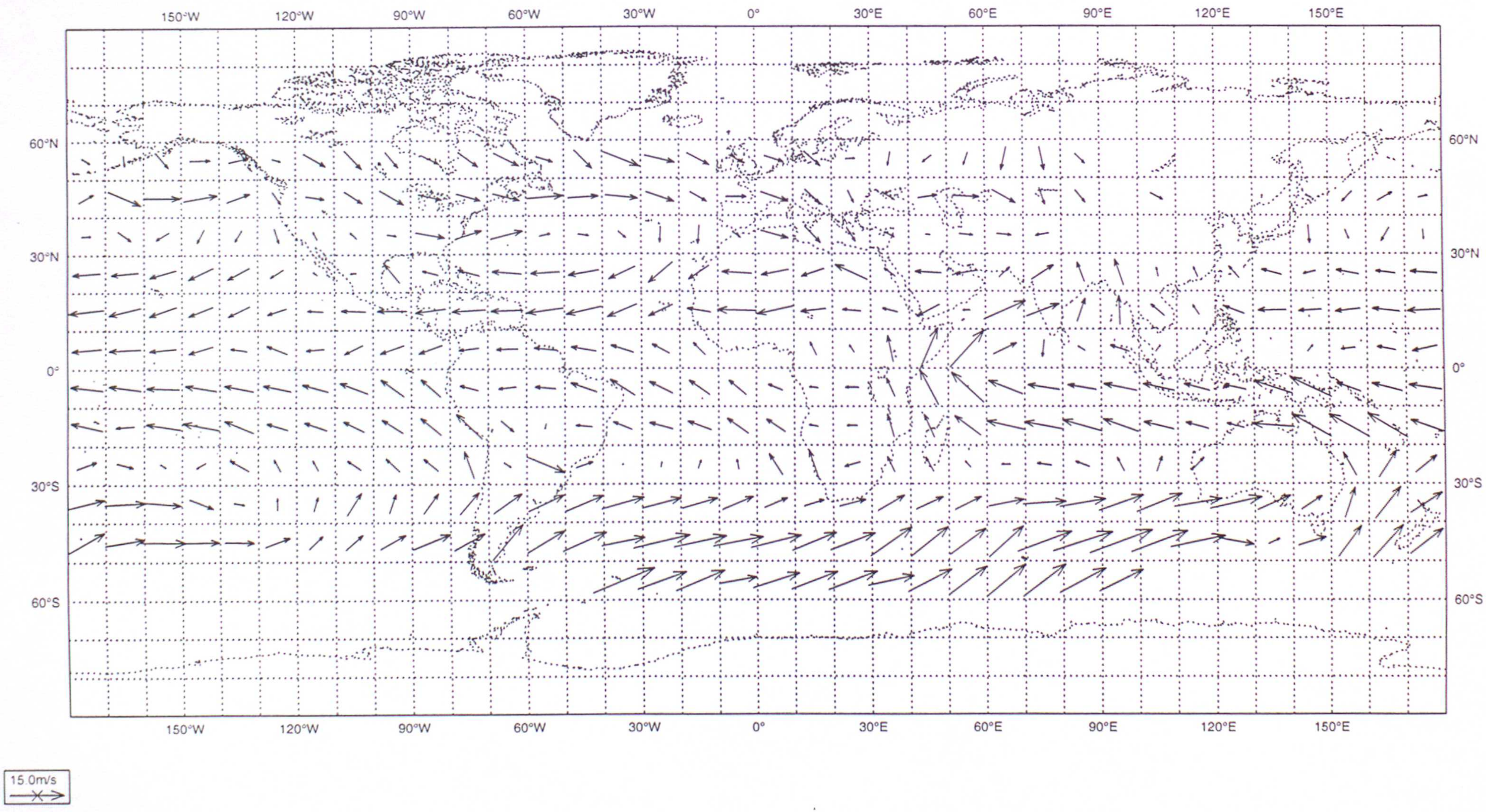

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 12. SATOB 701 - 1000 hPa mean vector wind differences. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

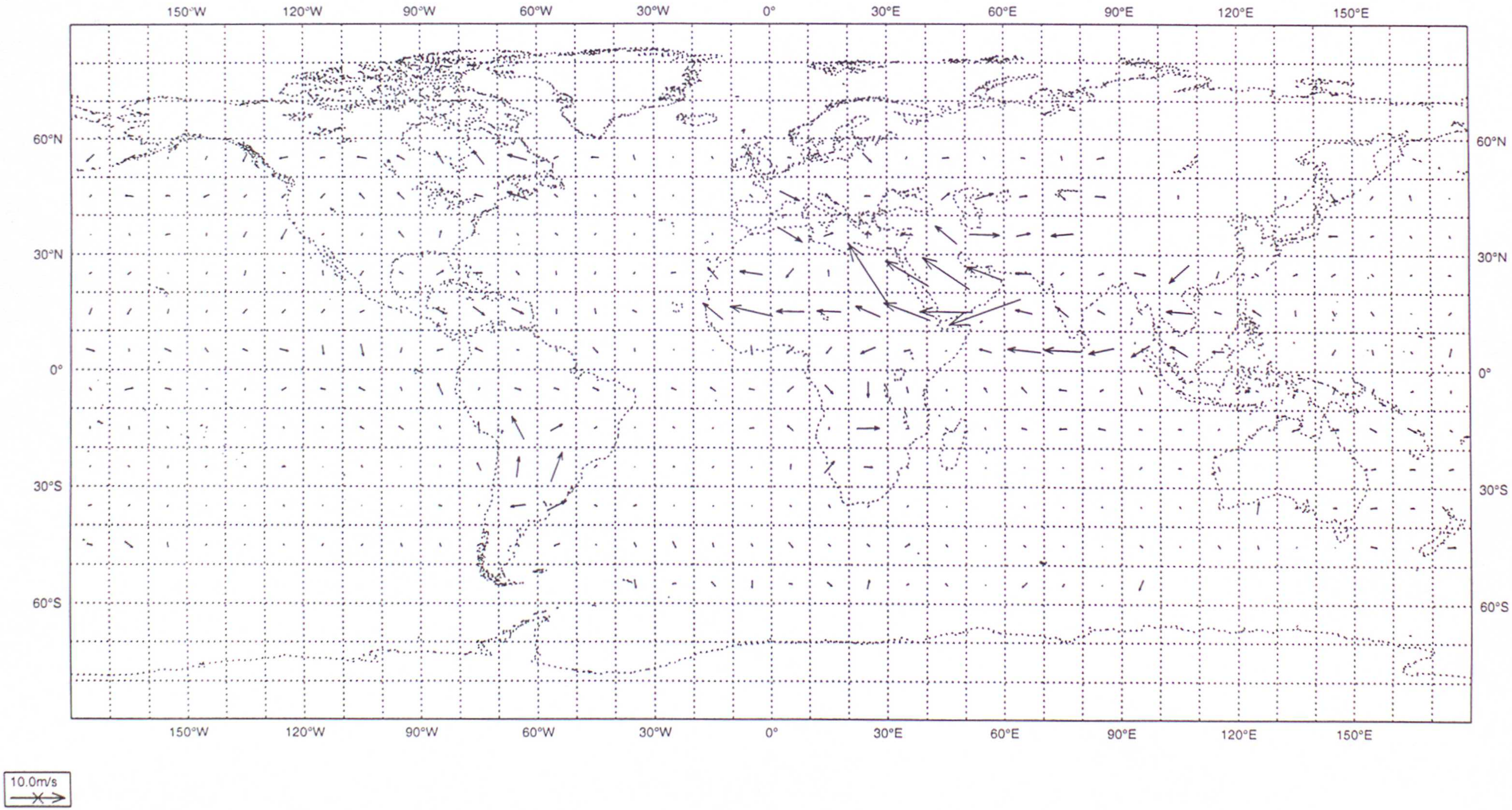

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 13. SATOB 701 - 1000 hPa mean O-B speed differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present

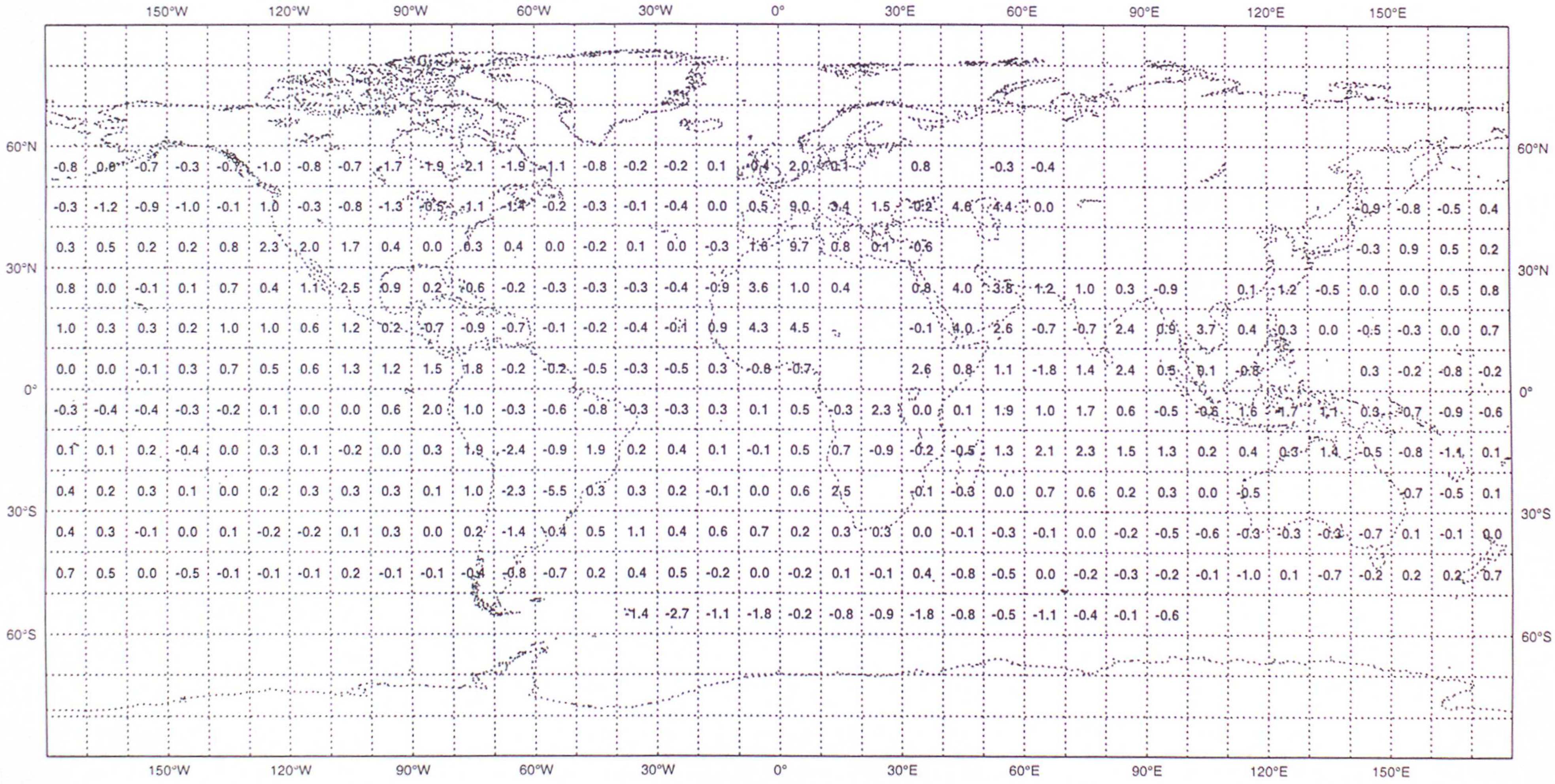
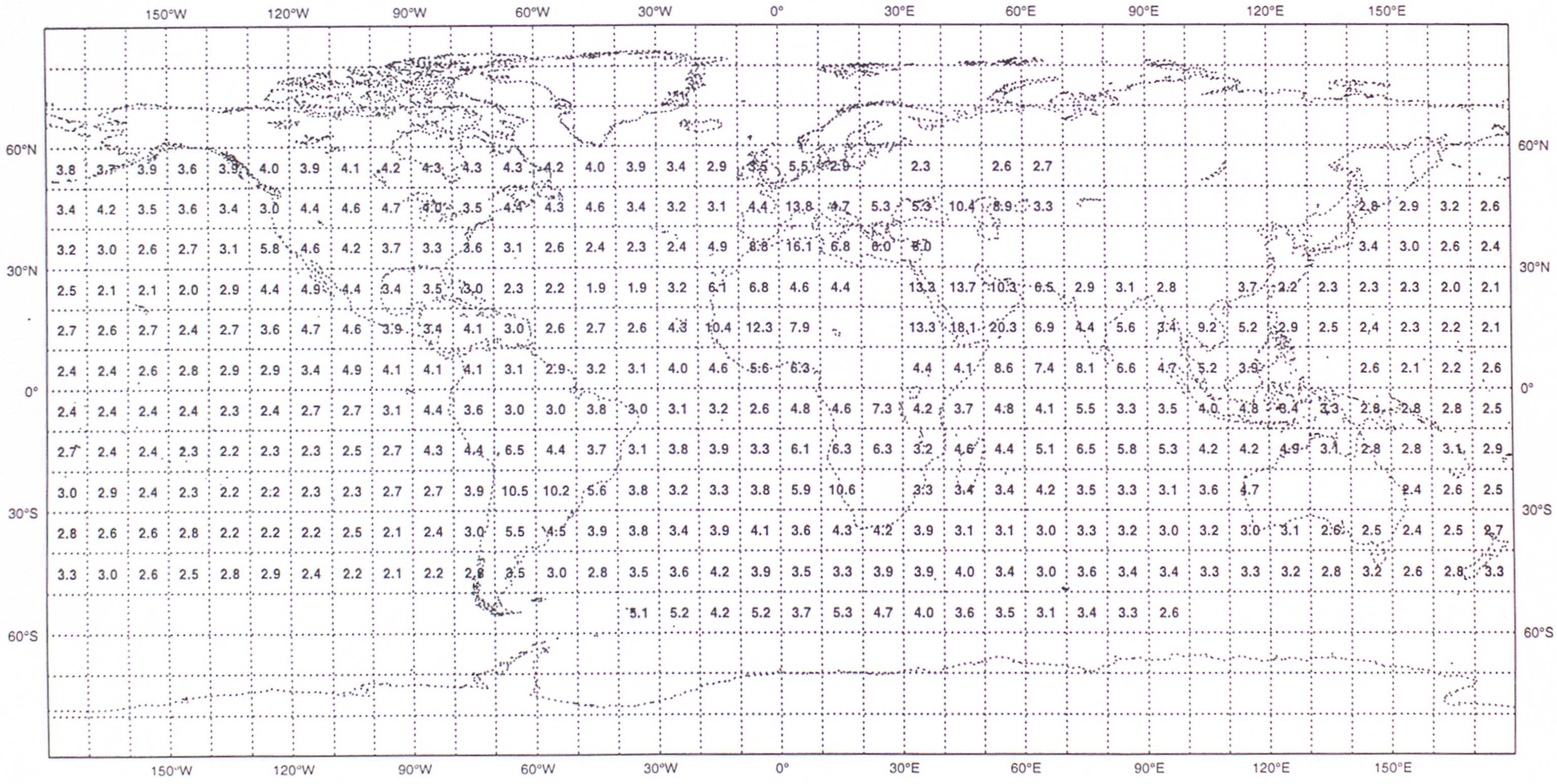

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.8 0.8 -0.7 -0.3 -0.7 -1.0 -0.8 -0.7 -1.7 -1.9 -2.1 -1.9 -1.1 -0.8 -0.2 -0.2 0.1 -0.4 2.0 -0.1 0.8 -0.3 -0.4
-0.3 -1.2 -0.9 -1.0 -0.1 1.0 -0.3 -0.8 -1.3 -0.5 -1.1 -1.4 -0.2 -0.3 -0.1 -0.4 0.0 0.5 9.0 3.4 1.5 -0.2 4.6 4.4 0.0 -0.9 -0.8 -0.5 0.4
0.3 0.5 0.2 0.2 0.8 2.3 2.0 1.7 0.4 0.0 0.3 0.4 0.0 -0.2 0.1 0.0 -0.3 1.6 9.7 0.8 0.1 -0.6 -0.3 0.9 0.5 0.2
0.8 0.0 -0.1 0.1 0.7 0.4 1.1 2.5 0.9 0.2 0.6 -0.2 -0.3 -0.3 -0.3 -0.4 -0.9 3.6 1.0 0.4 0.8 4.0 3.8 1.2 1.0 0.3 -0.9 0.1 1.2 -0.5 0.0 0.0 0.5 0.8
1.0 0.3 0.3 0.2 1.0 1.0 0.6 1.2 0.2 -0.7 -0.9 -0.7 -0.1 -0.2 -0.4 -0.1 0.9 4.3 4.5 -0.1 4.0 2.6 -0.7 -0.7 2.4 0.9 3.7 0.4 0.3 0.0 -0.5 -0.3 0.0 0.7
0.0 0.0 -0.1 0.3 0.7 0.5 0.6 1.3 1.2 1.5 1.8 -0.2 -0.2 -0.5 -0.3 -0.5 0.3 -0.8 -0.7 2.6 0.8 1.1 -1.8 1.4 2.4 0.5 0.1 -0.8 0.3 -0.2 -0.8 -0.2
-0.3 -0.4 -0.4 -0.3 -0.2 0.1 0.0 0.0 0.6 2.0 1.0 -0.3 -0.6 -0.8 -0.3 -0.3 0.3 0.1 0.5 -0.3 2.3 0.0 0.1 1.9 1.0 1.7 0.6 -0.5 -0.6 1.6 -1.7 1.1 0.3 -0.7 -0.9 -0.6
0.1 0.1 0.2 -0.4 0.0 0.3 0.1 -0.2 0.0 0.3 1.9 -2.4 -0.9 1.9 0.2 0.4 0.1 -0.1 0.5 0.7 -0.9 -0.2 -0.5 1.3 2.1 2.3 1.5 1.3 0.2 0.4 0.3 1.4 -0.5 -0.8 -1.1 0.1
0.4 0.2 0.3 0.1 0.0 0.2 0.3 0.3 0.3 0.1 1.0 -2.3 -5.5 0.3 0.3 0.2 -0.1 0.0 0.6 2.5 -0.1 -0.3 0.0 0.7 0.6 0.2 0.3 0.0 -0.5 -0.7 -0.5 0.1
0.4 0.3 -0.1 0.0 0.1 -0.2 -0.2 0.1 0.3 0.0 0.2 -1.4 -0.4 0.5 1.1 0.4 0.6 0.7 0.2 0.3 0.3 0.0 -0.1 -0.3 -0.1 0.0 -0.2 -0.5 -0.6 -0.3 -0.3 -0.3 -0.7 0.1 -0.1 0.0
0.7 0.5 0.0 -0.5 -0.1 -0.1 -0.1 0.2 -0.1 -0.1 -0.4 -0.8 -0.7 0.2 0.4 0.5 -0.2 0.0 -0.2 0.1 -0.1 0.4 -0.8 -0.5 0.0 -0.2 -0.3 -0.2 -0.1 -1.0 0.1 -0.7 -0.2 0.2 0.2 0.7
-1.4 -2.7 -1.1 -1.8 -0.2 -0.8 -0.9 -1.8 -0.8 -0.5 -1.1 -0.4 -0.1 -0.6

Figure 14. SATOB 701 - 1000 hPa mean RMS O-B vector differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
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90°E
120°E
150°E
60°N
30°N
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30°S
60°S
3.8 3.7 3.9 3.6 3.9 4.0 3.9 4.1 4.2 4.3 4.3 4.3 4.2 4.0 3.9 3.4 2.9 3.5 5.5 2.9 2.3 2.6 2.7
3.4 4.2 3.5 3.6 3.4 3.0 4.4 4.6 4.7 4.0 3.5 4.4 4.3 4.6 3.4 3.2 3.1 4.4 13.8 4.7 5.3 5.3 10.4 8.9 3.3 2.8 2.9 3.2 2.6
3.2 3.0 2.6 2.7 3.1 5.8 4.6 4.2 3.7 3.3 3.6 3.1 2.6 2.4 2.3 2.4 4.9 8.8 16.1 6.8 6.0 8.0 3.4 3.0 2.6 2.4
2.5 2.1 2.1 2.0 2.9 4.4 4.9 4.4 3.4 3.5 3.0 2.3 2.2 1.9 1.9 3.2 6.1 6.8 4.6 4.4 13.3 13.7 10.3 6.5 2.9 3.1 2.8 3.7 2.2 2.3 2.3 2.3 2.0 2.1
2.7 2.6 2.7 2.4 2.7 3.6 4.7 4.6 3.9 3.4 4.1 3.0 2.6 2.7 2.6 4.3 10.4 12.3 7.9 13.3 18.1 20.3 6.9 4.4 5.6 3.4 9.2 5.2 2.9 2.5 2.4 2.3 2.2 2.1
2.4 2.4 2.6 2.8 2.9 2.9 3.4 4.9 4.1 4.1 4.1 3.1 2.9 3.2 3.1 4.0 4.6 5.6 6.3 4.4 4.1 8.6 7.4 8.1 6.6 4.7 5.2 3.9 2.6 2.1 2.2 2.6
2.4 2.4 2.4 2.4 2.3 2.4 2.7 2.7 3.1 4.4 3.6 3.0 3.0 3.8 3.0 3.1 3.2 2.6 4.8 4.6 7.3 4.2 3.7 4.8 4.1 5.5 3.3 3.5 4.0 4.8 8.4 3.3 2.8 2.8 2.8 2.5
2.7 2.4 2.4 2.3 2.2 2.3 2.3 2.5 2.7 4.3 4.4 6.5 4.4 3.7 3.1 3.8 3.9 3.3 6.1 6.3 6.3 3.2 4.6 4.4 5.1 6.5 5.8 5.3 4.2 4.2 4.9 3.1 2.8 2.8 3.1 2.9
3.0 2.9 2.4 2.3 2.2 2.2 2.3 2.3 2.7 2.7 3.9 10.5 10.2 5.6 3.8 3.2 3.3 3.8 5.9 10.6 3.3 3.4 3.4 4.2 3.5 3.3 3.1 3.6 4.7 2.4 2.6 2.5
2.8 2.6 2.6 2.8 2.2 2.2 2.2 2.5 2.1 2.4 3.0 5.5 4.5 3.9 3.8 3.4 3.9 4.1 3.6 4.3 4.2 3.9 3.1 3.1 3.0 3.3 3.2 3.0 3.2 3.0 3.1 2.6 2.5 2.4 2.5 2.7
3.3 3.0 2.6 2.5 2.8 2.9 2.4 2.2 2.1 2.2 2.8 3.5 3.0 2.8 3.5 3.6 4.2 3.9 3.5 3.3 3.9 3.9 4.0 3.4 3.0 3.6 3.4 3.4 3.3 3.3 3.2 2.8 3.2 2.6 2.8 3.3
5.1 5.2 4.2 5.2 3.7 5.3 4.7 4.0 3.6 3.5 3.1 3.4 3.3 2.6

Figure 15. SATOB 401 - 700 hPa mean daily count. JULY 2003
Global average number of observations in 24 hours = 7773

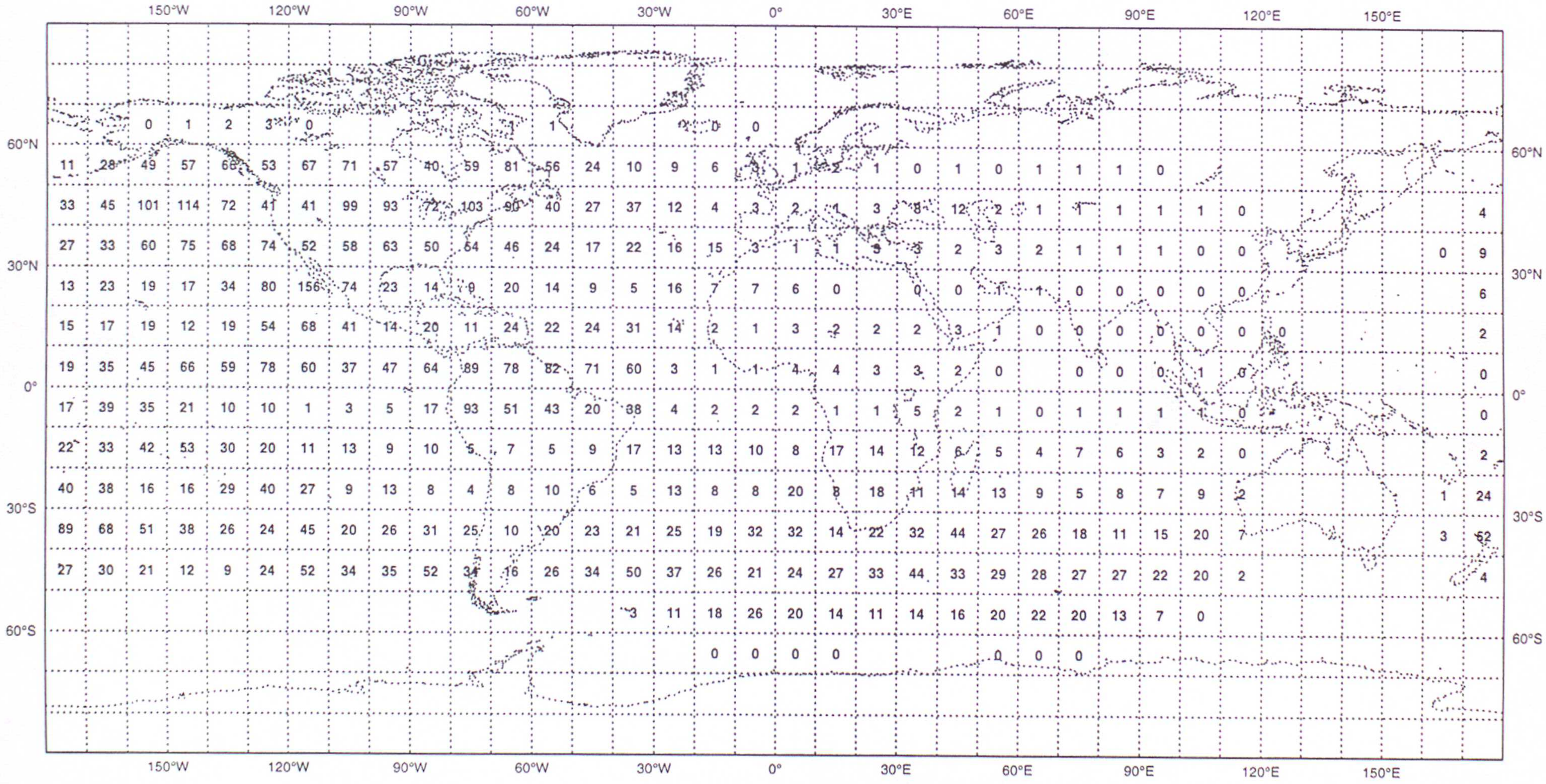

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
0 1 2 3 0 1 1 0 0 0
11 28 49 57 66 53 67 71 57 40 59 81 56 24 10 9 6 3 1 2 1 0 1 0 1 1 1 0
33 45 101 114 72 41 41 99 93 72 103 90 40 27 37 12 4 3 2 1 3 8 12 2 1 1 1 1 1 0 4
27 33 60 75 68 74 52 58 63 50 64 46 24 17 22 16 15 3 1 1 5 3 2 3 2 1 1 1 0 0 0 9
13 23 19 17 34 80 156 74 23 14 9 20 14 9 5 16 7 7 6 0 0 0 1 1 0 0 0 0 0 6
15 17 19 12 19 54 68 41 14 20 11 24 22 24 31 14 2 1 3 2 2 2 3 1 0 0 0 0 0 0 0 2
19 35 45 66 59 78 60 37 47 64 89 78 82 71 60 3 1 1 4 4 3 3 2 0 0 0 0 1 0 0
17 39 35 21 10 10 1 3 5 17 93 51 43 20 38 4 2 2 2 1 1 5 2 1 0 1 1 1 1 0 0
22 33 42 53 30 20 11 13 9 10 5 7 5 9 17 13 13 10 8 17 14 12 6 5 4 7 6 3 2 0 2
40 38 16 16 29 40 27 9 13 8 4 8 10 6 5 13 8 8 20 8 18 11 14 13 9 5 8 7 9 2 1 24
89 68 51 38 26 24 45 20 26 31 25 10 20 23 21 25 19 32 32 14 22 32 44 27 26 18 11 15 20 7 3 52
27 30 21 12 9 24 52 34 35 52 34 16 26 34 50 37 26 21 24 27 33 44 33 29 28 27 27 22 20 2 4
3 11 18 26 20 14 11 14 16 20 22 20 13 7 0
0 0 0 0 0 0 0
150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 16. SATOB 401 - 700 hPa vector mean wind. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

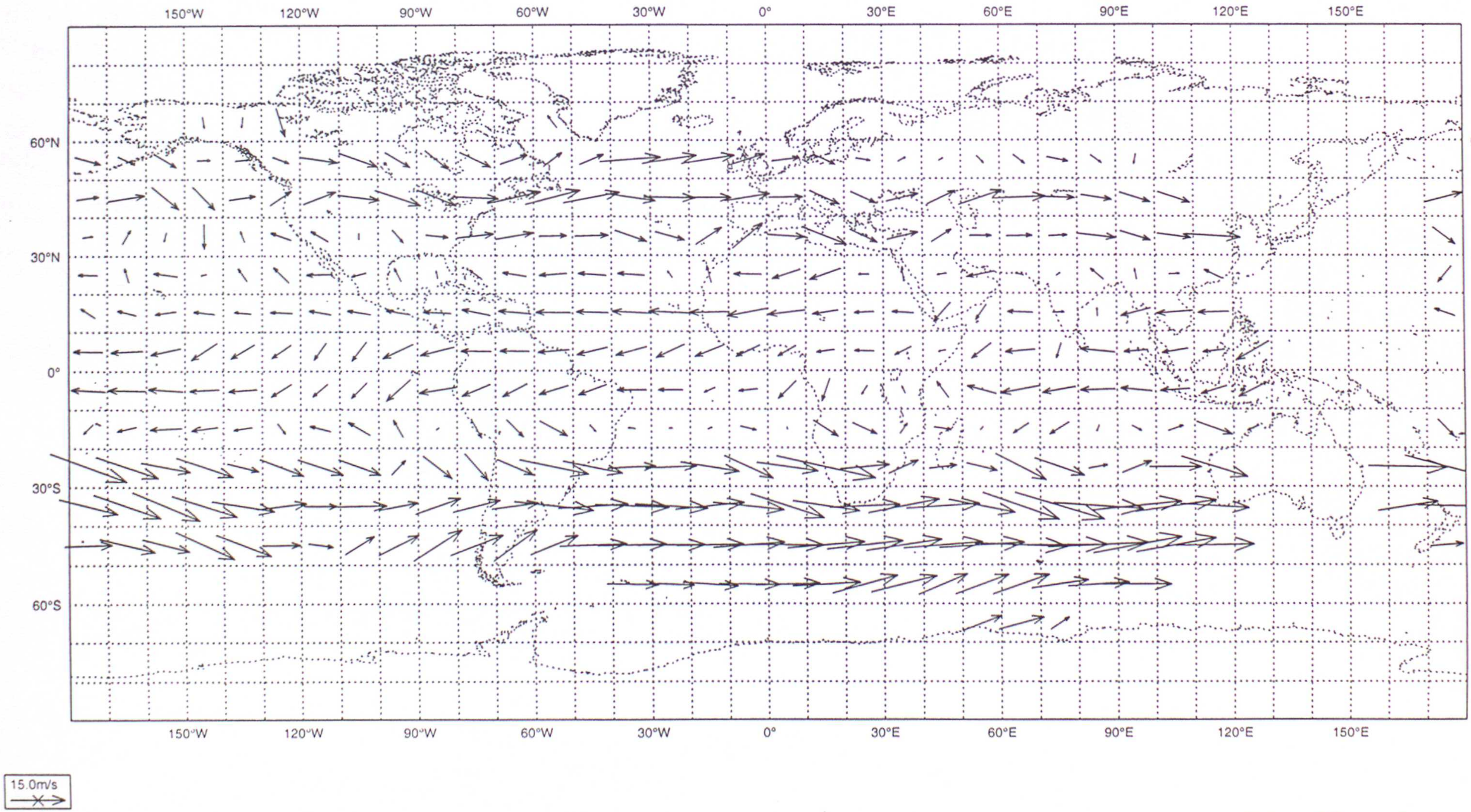

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 17. SATOB 401 - 700 hPa mean vector wind differences. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

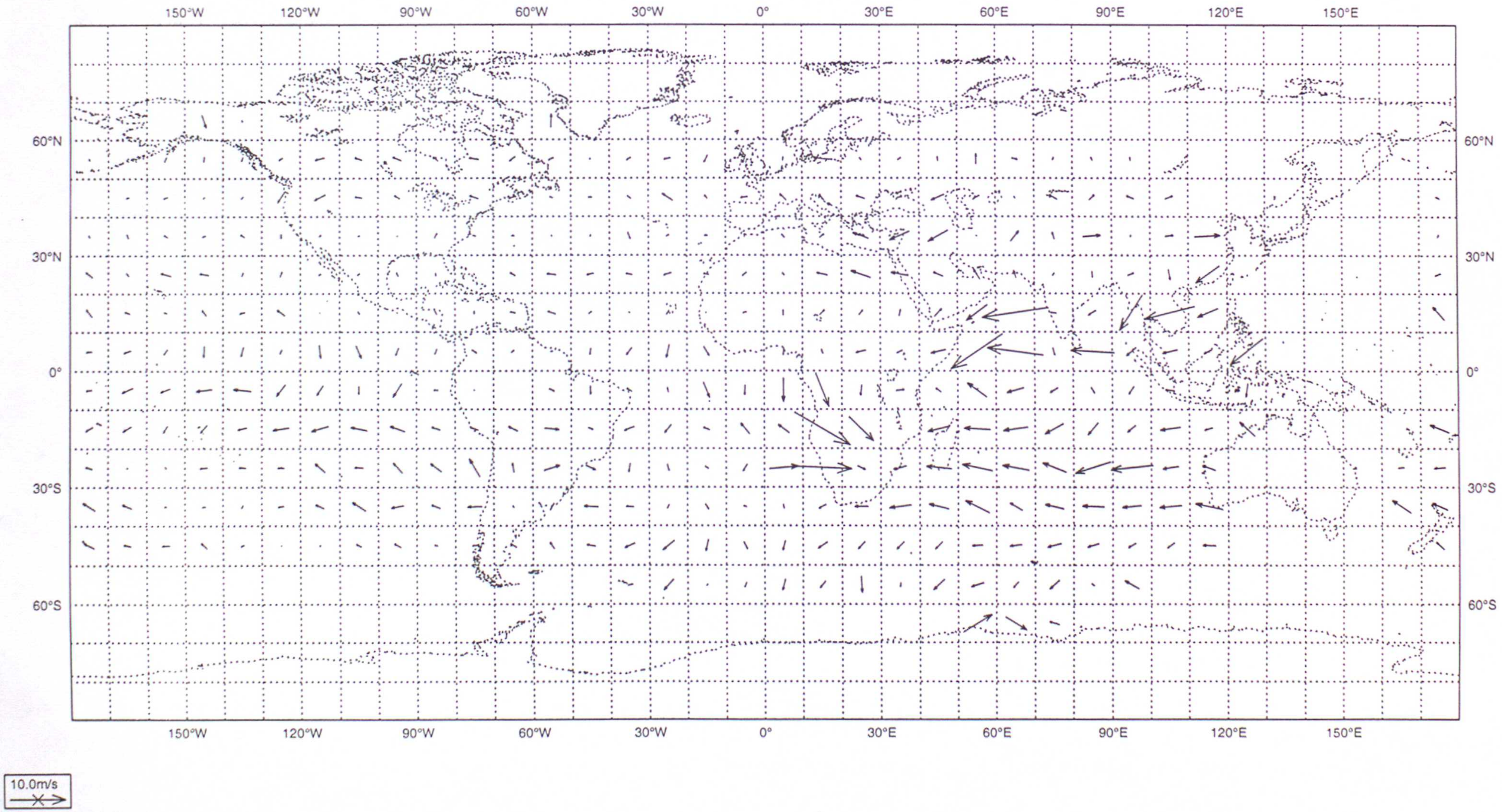

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 18. SATOB 401 - 700 hPa mean O-B speed differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present

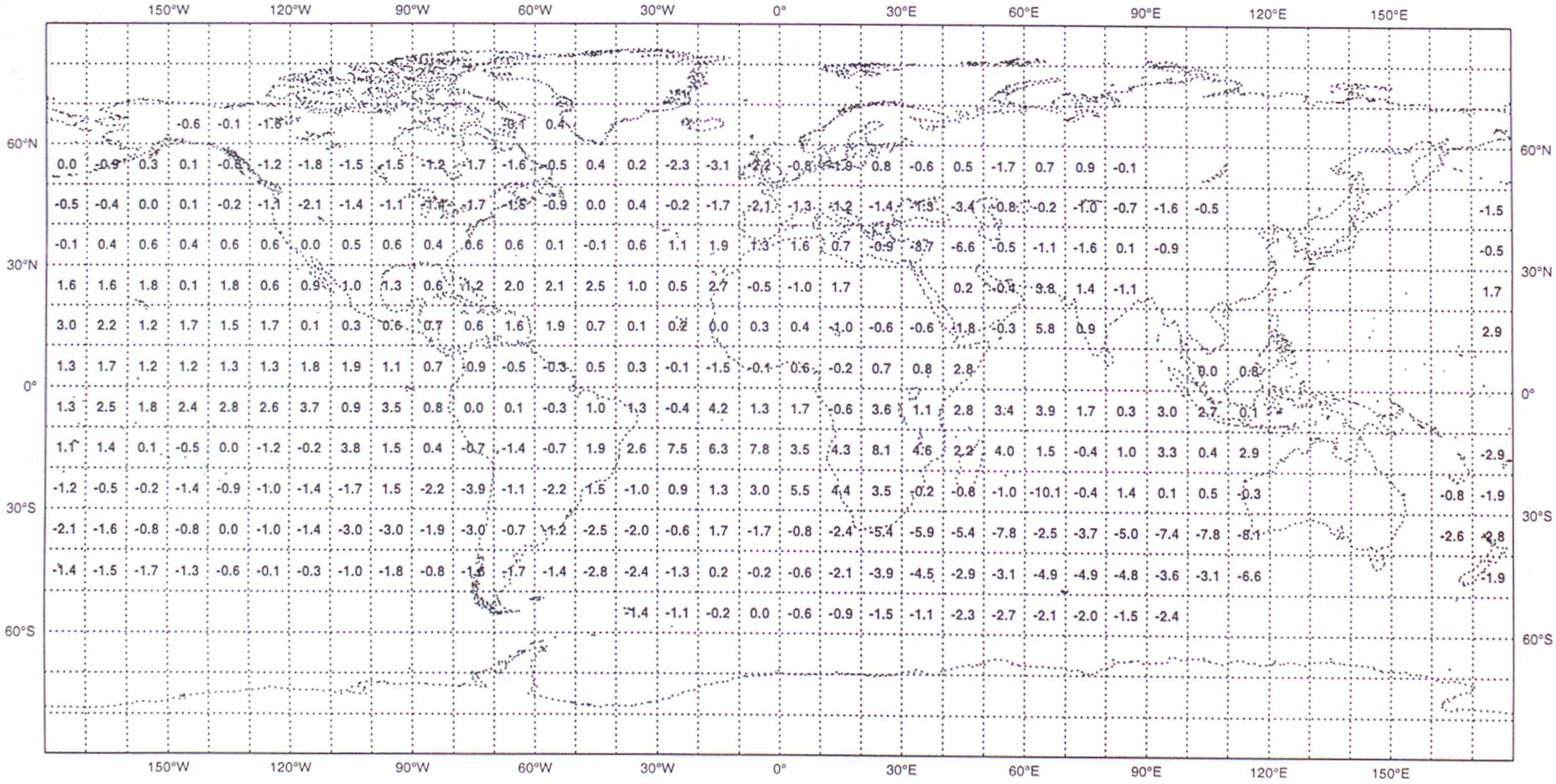

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-0.6 -0.1 -1.8 0.1 0.4
0.0 -0.9 0.3 0.1 -0.8 -1.2 -1.8 -1.5 -1.5 -1.2 -1.7 -1.6 -0.5 0.4 0.2 -2.3 -3.1 -2.2 -0.8 -1.9 0.8 -0.6 0.5 -1.7 0.7 0.9 -0.1
-0.5 -0.4 0.0 0.1 -0.2 -1.1 -2.1 -1.4 -1.1 -1.4 -1.7 -1.8 -0.9 0.0 0.4 -0.2 -1.7 -2.1 -1.3 -1.2 -1.4 -1.3 -3.4 -0.8 -0.2 -1.0 -0.7 -1.6 -0.5 -1.5
-0.1 0.4 0.6 0.4 0.6 0.6 0.0 0.5 0.6 0.4 0.6 0.6 0.1 -0.1 0.6 1.1 1.9 1.3 1.6 0.7 -0.9 -8.7 -6.6 -0.5 -1.1 -1.6 0.1 -0.9 -0.5
1.6 1.6 1.8 0.1 1.8 0.6 0.9 1.0 1.3 0.6 1.2 2.0 2.1 2.5 1.0 0.5 2.7 -0.5 -1.0 1.7 0.2 -0.4 3.8 1.4 -1.1 1.7
3.0 2.2 1.2 1.7 1.5 1.7 0.1 0.3 0.6 0.7 0.6 1.6 1.9 0.7 0.1 0.2 0.0 0.3 0.4 -1.0 -0.6 -0.6 -1.8 -0.3 5.8 0.9 2.9
1.3 1.7 1.2 1.2 1.3 1.3 1.8 1.9 1.1 0.7 -0.9 -0.5 -0.3 0.5 0.3 -0.1 -1.5 -0.1 0.6 -0.2 0.7 0.8 2.8 0.0 0.8
1.3 2.5 1.8 2.4 2.8 2.6 3.7 0.9 3.5 0.8 0.0 0.1 -0.3 1.0 1.3 -0.4 4.2 1.3 1.7 -0.6 3.6 1.1 2.8 3.4 3.9 1.7 0.3 3.0 2.7 0.1
1.1 1.4 0.1 -0.5 0.0 -1.2 -0.2 3.8 1.5 0.4 -0.7 -1.4 -0.7 1.9 2.6 7.5 6.3 7.8 3.5 4.3 8.1 4.6 2.2 4.0 1.5 -0.4 1.0 3.3 0.4 2.9 -2.9
-1.2 -0.5 -0.2 -1.4 -0.9 -1.0 -1.4 -1.7 1.5 -2.2 -3.9 -1.1 -2.2 1.5 -1.0 0.9 1.3 3.0 5.5 4.4 3.5 -0.2 -0.8 -1.0 -10.1 -0.4 1.4 0.1 0.5 -0.3 -0.8 -1.9
-2.1 -1.6 -0.8 -0.8 0.0 -1.0 -1.4 -3.0 -3.0 -1.9 -3.0 -0.7 1.2 -2.5 -2.0 -0.6 1.7 -1.7 -0.8 -2.4 -5.4 -5.9 -5.4 -7.8 -2.5 -3.7 -5.0 -7.4 -7.8 -8.1 -2.6 -2.8
-1.4 -1.5 -1.7 -1.3 -0.6 -0.1 -0.3 -1.0 -1.8 -0.8 -1.6 -1.7 -1.4 -2.8 -2.4 -1.3 0.2 -0.2 -0.6 -2.1 -3.9 -4.5 -2.9 -3.1 -4.9 -4.9 -4.8 -3.6 -3.1 -6.6 -1.9
-1.4 -1.1 -0.2 0.0 -0.6 -0.9 -1.5 -1.1 -2.3 -2.7 -2.1 -2.0 -1.5 -2.4

Figure 19. SATOB 401 - 700 hPa mean RMS O-B vector differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present

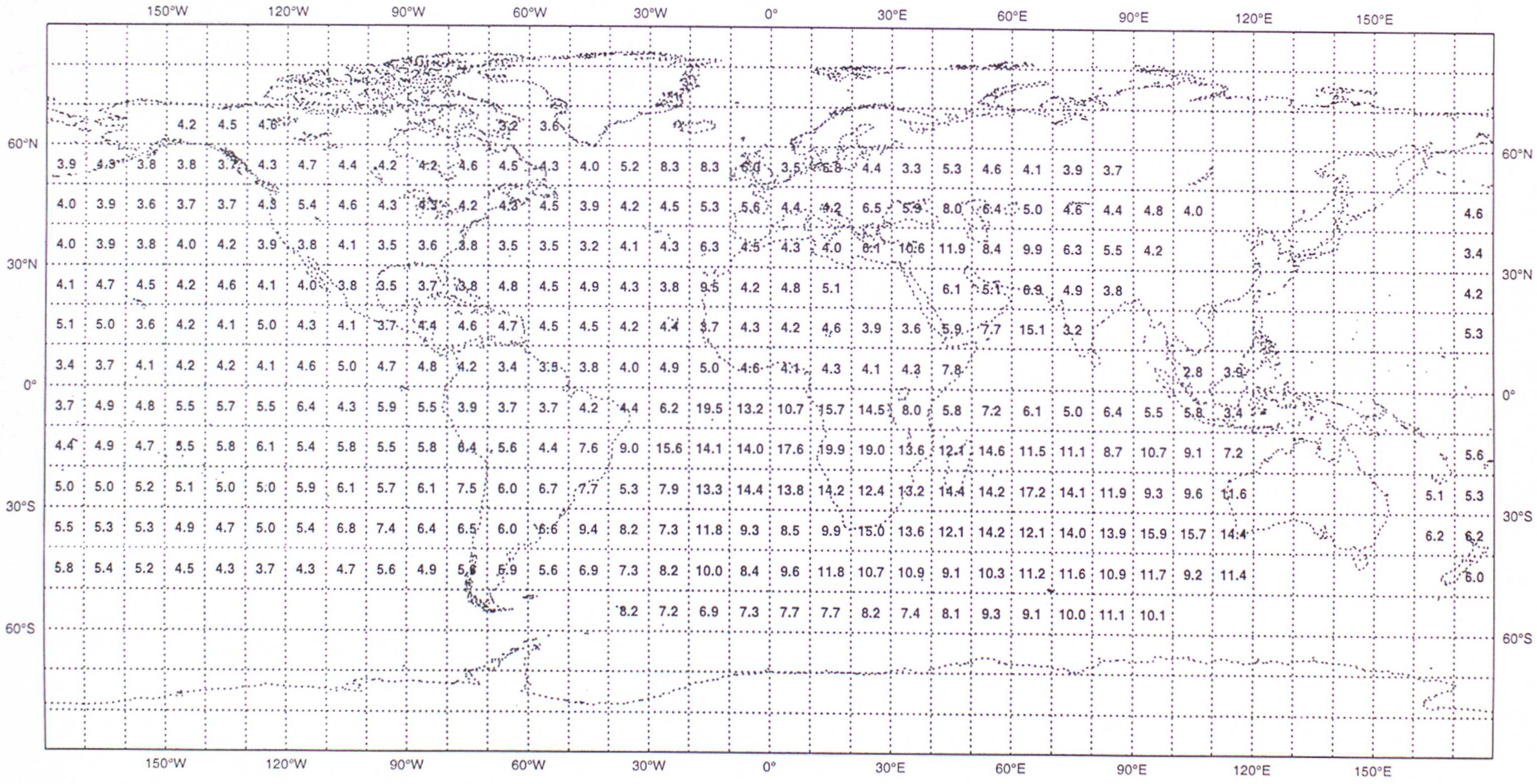

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.2 4.5 4.6 3.2 3.6
3.9 4.3 3.8 3.8 3.7 4.3 4.7 4.4 4.2 4.2 4.6 4.5 4.3 4.0 5.2 8.3 8.3 6.0 3.5 5.8 4.4 3.3 5.3 4.6 4.1 3.9 3.7
4.0 3.9 3.6 3.7 3.7 4.3 5.4 4.6 4.3 4.3 4.2 4.3 4.5 3.9 4.2 4.5 5.3 5.6 4.4 4.2 6.5 5.9 8.0 6.4 5.0 4.6 4.4 4.8 4.0 4.6
4.0 3.9 3.8 4.0 4.2 3.9 3.8 4.1 3.5 3.6 3.8 3.5 3.5 3.2 4.1 4.3 6.3 4.5 4.3 4.0 6.1 10.6 11.9 8.4 9.9 6.3 5.5 4.2 3.4
4.1 4.7 4.5 4.2 4.6 4.1 4.0 3.8 3.5 3.7 3.8 4.8 4.5 4.9 4.3 3.8 9.5 4.2 4.8 5.1 6.1 5.1 6.9 4.9 3.8 4.2
5.1 5.0 3.6 4.2 4.1 5.0 4.3 4.1 3.7 4.4 4.6 4.7 4.5 4.5 4.2 4.4 3.7 4.3 4.2 4.6 3.9 3.6 5.9 7.7 15.1 3.2 5.3
3.4 3.7 4.1 4.2 4.2 4.1 4.6 5.0 4.7 4.8 4.2 3.4 3.5 3.8 4.0 4.9 5.0 4.6 4.1 4.3 4.1 4.3 7.8 2.8 3.9
3.7 4.9 4.8 5.5 5.7 5.5 6.4 4.3 5.9 5.5 3.9 3.7 3.7 4.2 4.4 6.2 19.5 13.2 10.7 15.7 14.5 8.0 5.8 7.2 6.1 5.0 6.4 5.5 5.8 3.4
4.4 4.9 4.7 5.5 5.8 6.1 5.4 5.8 5.5 5.8 6.4 5.6 4.4 7.6 9.0 15.6 14.1 14.0 17.6 19.9 19.0 13.6 12.1 14.6 11.5 11.1 8.7 10.7 9.1 7.2 5.6
5.0 5.0 5.2 5.1 5.0 5.0 5.9 6.1 5.7 6.1 7.5 6.0 6.7 7.7 5.3 7.9 13.3 14.4 13.8 14.2 12.4 13.2 14.4 14.2 17.2 14.1 11.9 9.3 9.6 11.6 5.1 5.3
5.5 5.3 5.3 4.9 4.7 5.0 5.4 6.8 7.4 6.4 6.5 6.0 6.6 9.4 8.2 7.3 11.8 9.3 8.5 9.9 15.0 13.6 12.1 14.2 12.1 14.0 13.9 15.9 15.7 14.4 6.2 6.2
5.8 5.4 5.2 4.5 4.3 3.7 4.3 4.7 5.6 4.9 5.6 5.9 5.6 6.9 7.3 8.2 10.0 8.4 9.6 11.8 10.7 10.9 9.1 10.3 11.2 11.6 10.9 11.7 9.2 11.4 6.0
8.2 7.2 6.9 7.3 7.7 7.7 8.2 7.4 8.1 9.3 9.1 10.0 11.1 10.1

Figure 20. SATOB 101 - 400 hPa mean daily count. JULY 2003
Global average number of observations in 24 hours = 91136

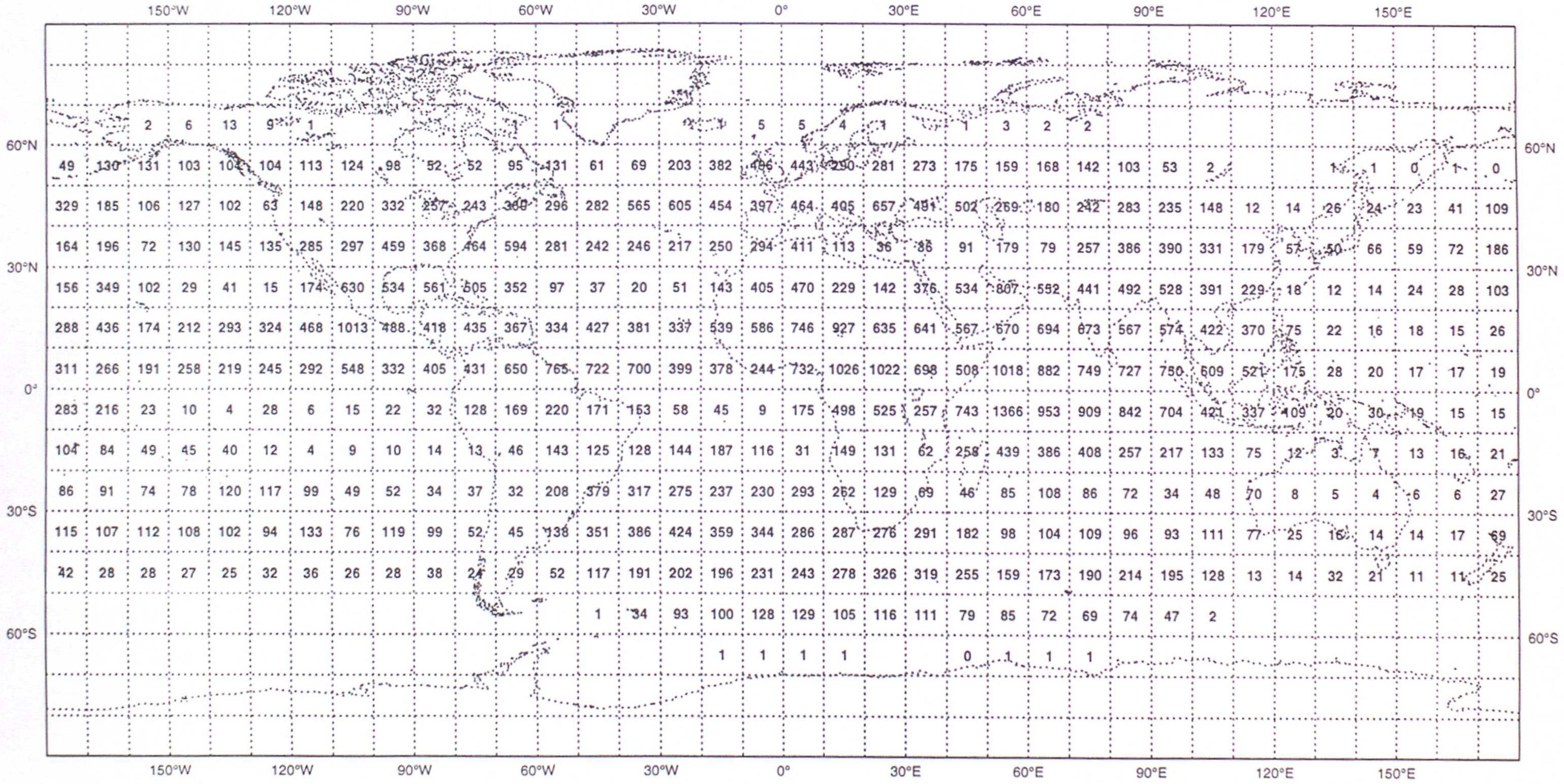

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
2 6 13 9 1 1 1 5 5 4 1 1 3 2 2
49 130 131 103 104 104 113 124 98 52 52 95 131 61 69 203 382 406 443 290 281 273 175 159 168 142 103 53 2 1 1 0 1 0
329 185 106 127 102 63 148 220 332 257 243 300 296 282 565 605 454 397 464 405 657 491 502 269 180 242 283 235 148 12 14 26 24 23 41 109
164 196 72 130 145 135 285 297 459 368 464 594 281 242 246 217 250 294 411 113 36 86 91 179 79 257 386 390 331 179 57 50 66 59 72 186
156 349 102 29 41 15 174 630 534 561 505 352 97 37 20 51 143 405 470 229 142 376 534 807 552 441 492 528 391 229 18 12 14 24 28 103
288 436 174 212 293 324 468 1013 488 418 435 367 334 427 381 337 539 586 746 927 635 641 567 670 694 673 567 574 422 370 75 22 16 18 15 26
311 266 191 258 219 245 292 548 332 405 431 650 765 722 700 399 378 244 732 1026 1022 698 508 1018 882 749 727 750 609 521 175 28 20 17 17 19
283 216 23 10 4 28 6 15 22 32 128 169 220 171 153 58 45 9 175 498 525 257 743 1366 953 909 842 704 421 337 109 20 30 19 15 15
104 84 49 45 40 12 4 9 10 14 13 46 143 125 128 144 187 116 31 149 131 62 258 439 386 408 257 217 133 75 12 3 7 13 16 21
86 91 74 78 120 117 99 49 52 34 37 32 208 379 317 275 237 230 293 262 129 69 46 85 108 86 72 34 48 70 8 5 4 6 6 27
115 107 112 108 102 94 133 76 119 99 52 45 138 351 386 424 359 344 286 287 276 291 182 98 104 109 96 93 111 77 25 16 14 14 17 69
42 28 28 27 25 32 36 26 28 38 24 29 52 117 191 202 196 231 243 278 326 319 255 159 173 190 214 195 128 13 14 32 21 11 11 25
1 34 93 100 128 129 105 116 111 79 85 72 69 74 47 2
1 1 1 1 0 1 1 1

Figure 21. SATOB 101 - 400 hPa vector mean wind. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

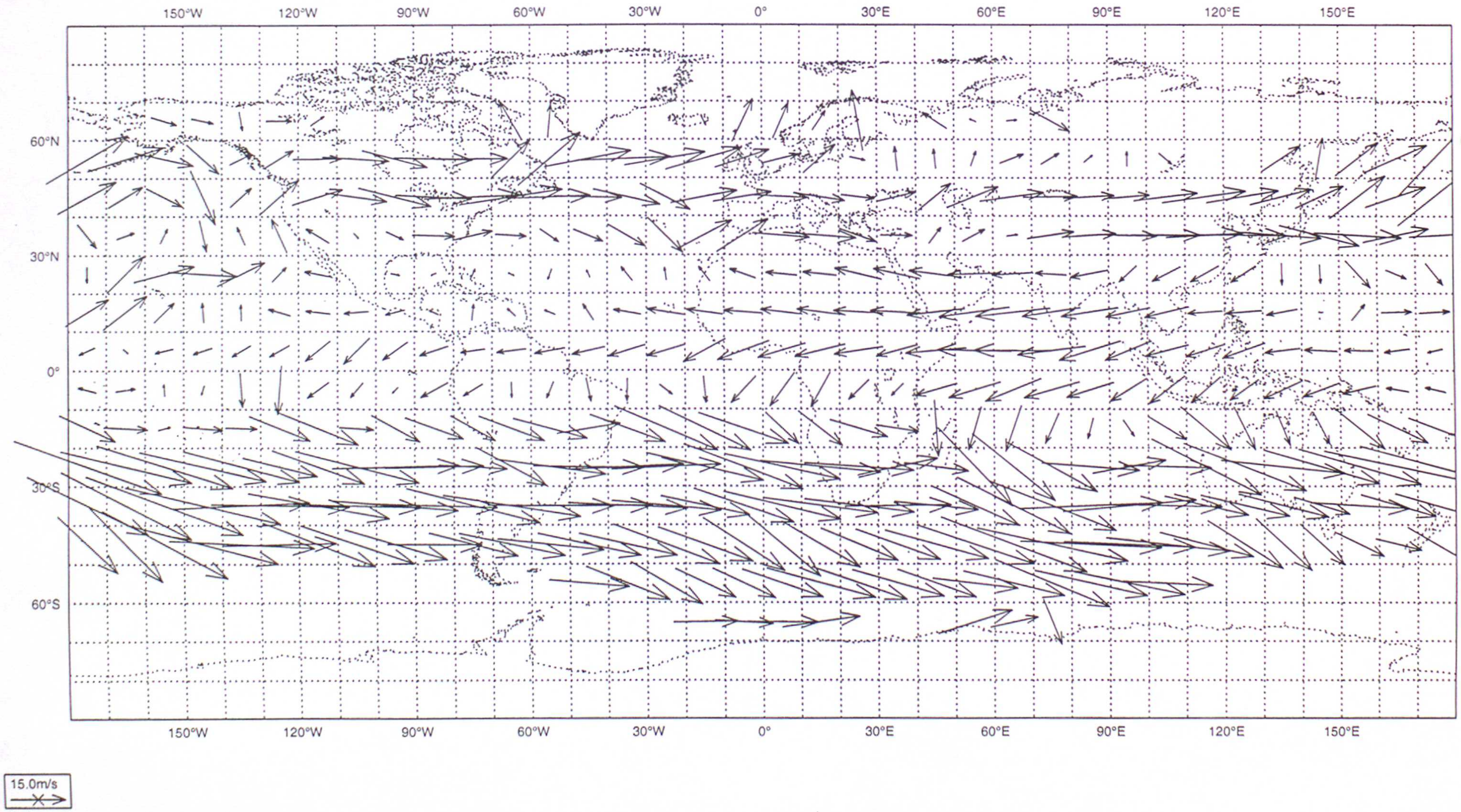

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
15.0m/s

Figure 22. SATOB 101 - 400 hPa mean vector wind differences. JULY 2003
All observations
Arrows are plotted where greater than 10 obs are present

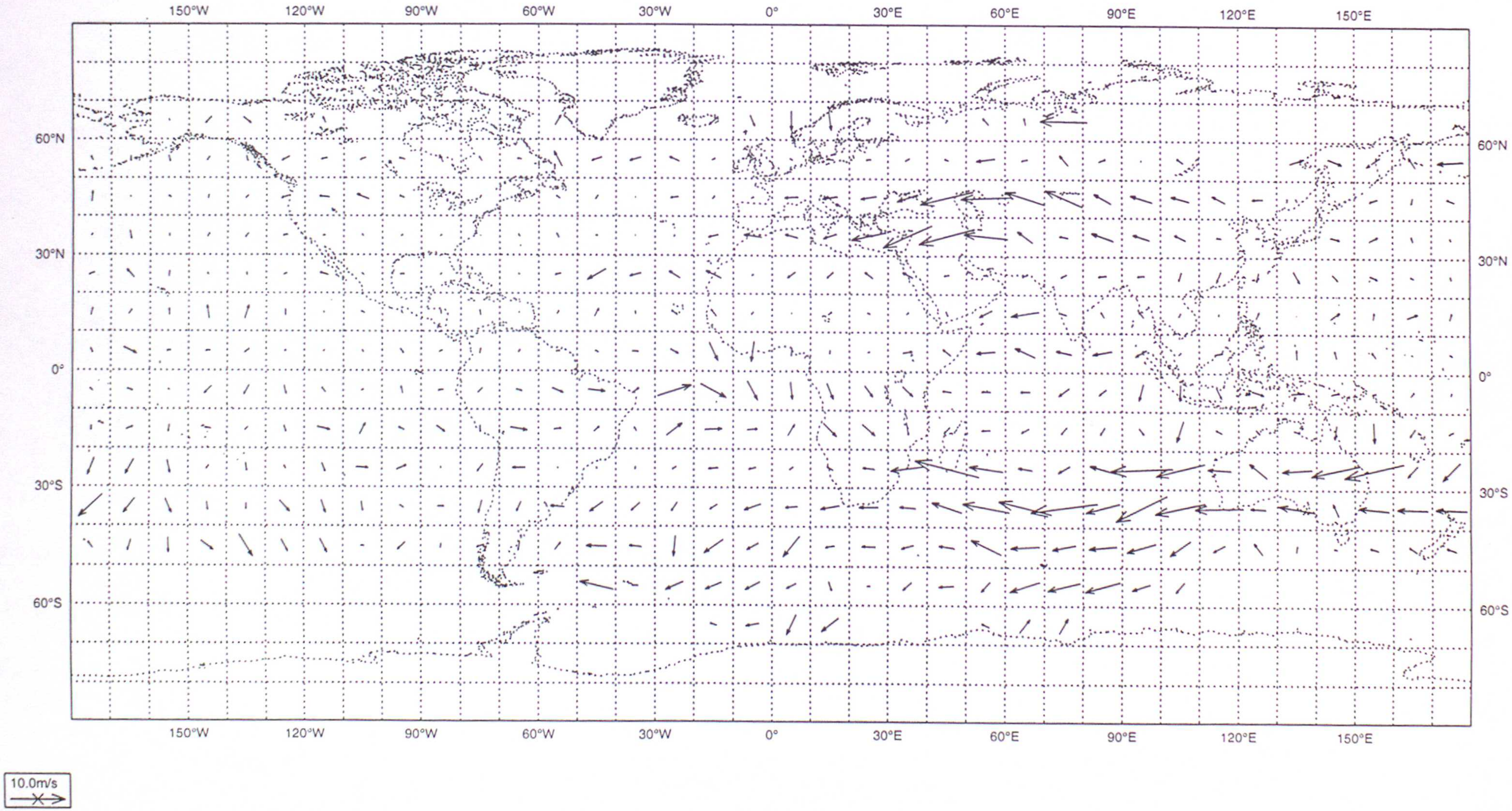

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
10.0m/s

Figure 23. SATOB 101 - 400 hPa mean O-B speed differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present

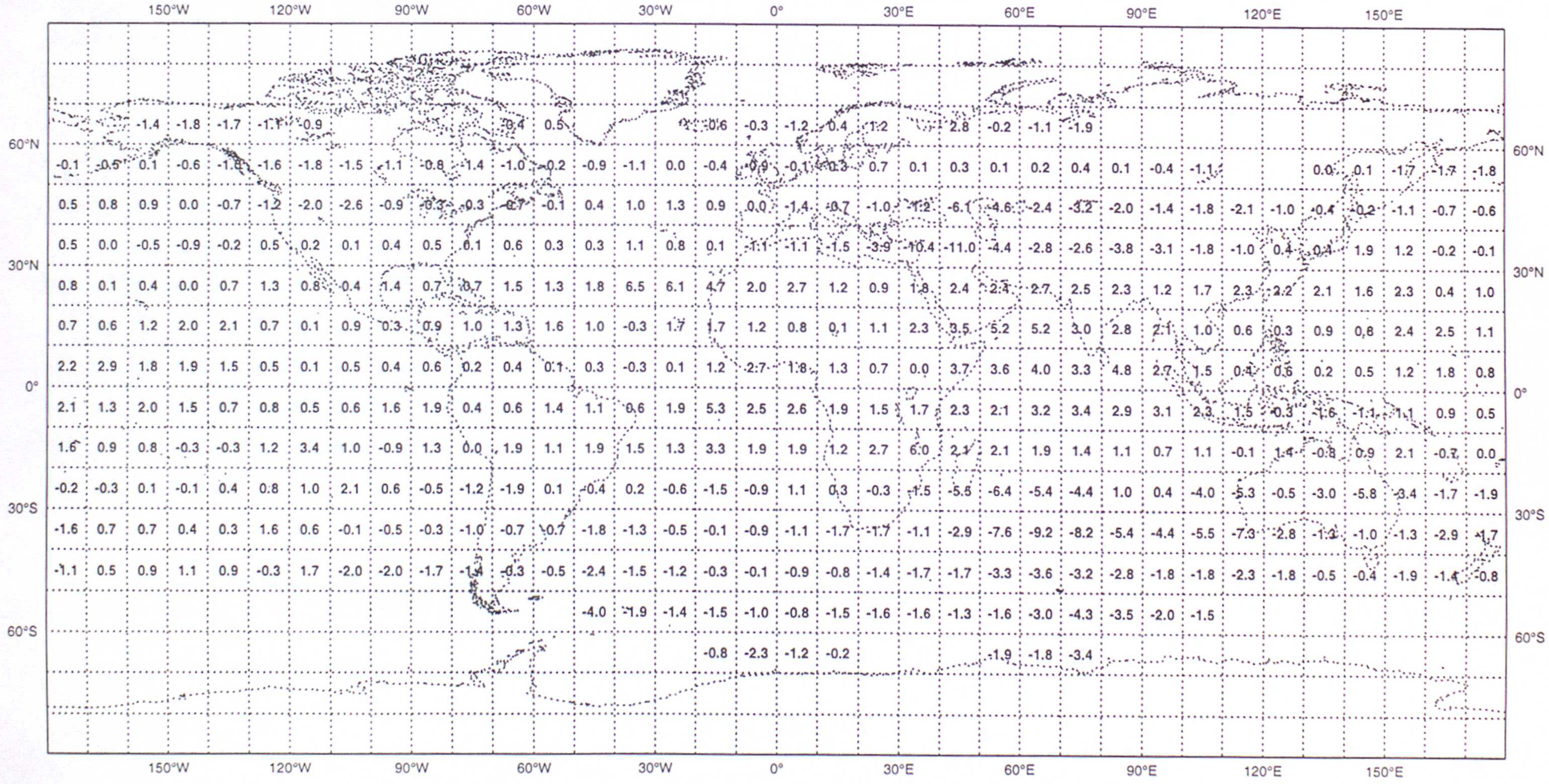
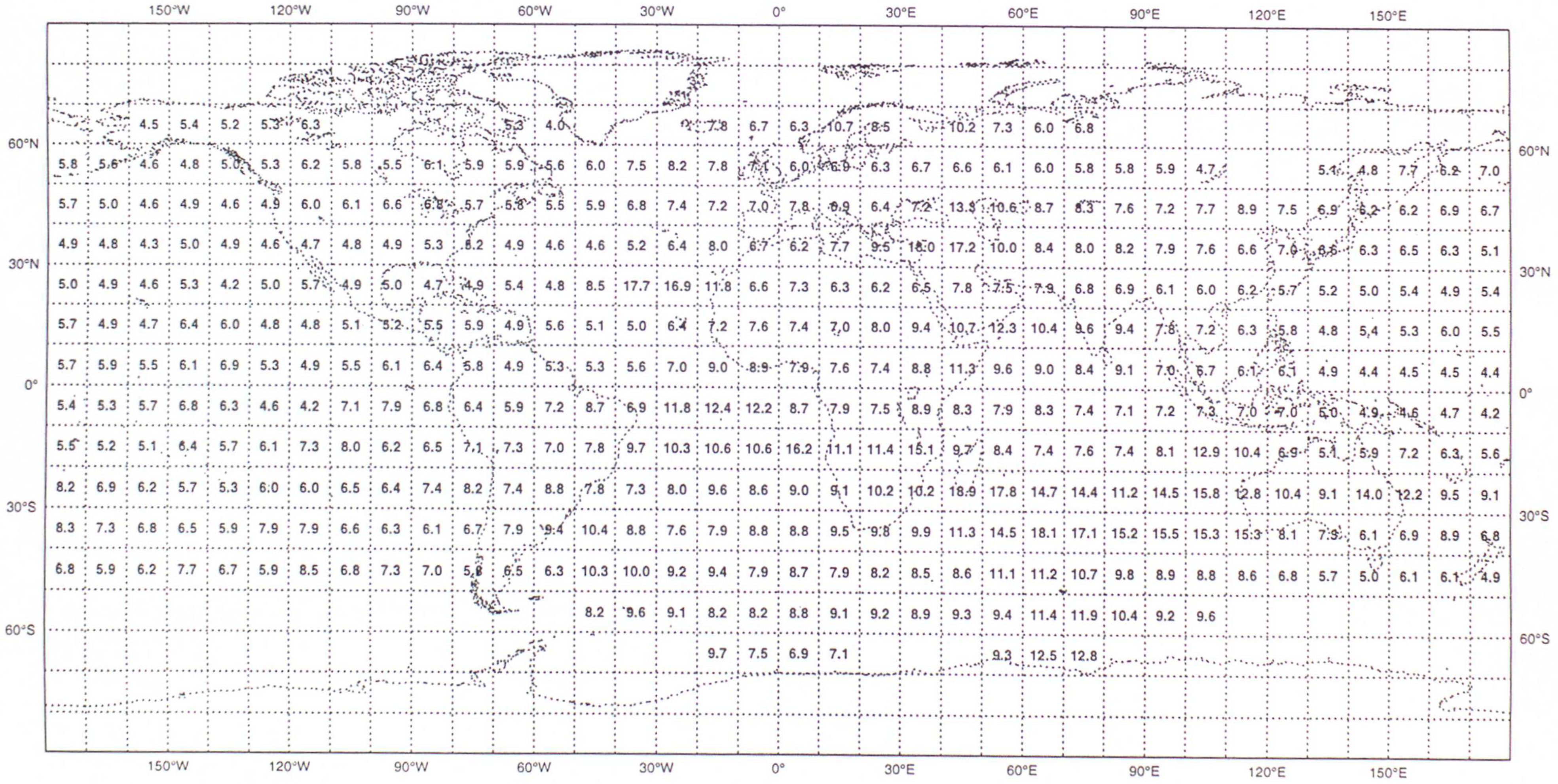

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-1.4 -1.8 -1.7 -1.1 -0.9 -0.4 0.5 -0.6 -0.3 -1.2 0.4 1.2 2.8 -0.2 -1.1 -1.9
-0.1 -0.5 0.1 -0.6 -1.8 -1.6 -1.8 -1.5 -1.1 -0.8 -1.4 -1.0 -0.2 -0.9 -1.1 0.0 -0.4 -0.9 -0.1 -0.3 0.7 0.1 0.3 0.1 0.2 0.4 0.1 -0.4 -1.1 0.0 0.1 -1.7 -1.7 -1.8
0.5 0.8 0.9 0.0 -0.7 -1.2 -2.0 -2.6 -0.9 -0.3 -0.3 -0.7 -0.1 0.4 1.0 1.3 0.9 0.0 -1.4 -0.7 -1.0 -1.2 -6.1 -4.6 -2.4 -3.2 -2.0 -1.4 -1.8 -2.1 -1.0 -0.4 -0.2 -1.1 -0.7 -0.6
0.5 0.0 -0.5 -0.9 -0.2 0.5 0.2 0.1 0.4 0.5 0.1 0.6 0.3 0.3 1.1 0.8 0.1 -1.1 -1.1 -1.5 -3.9 -10.4 -11.0 -4.4 -2.8 -2.6 -3.8 -3.1 -1.8 -1.0 0.4 0.4 1.9 1.2 -0.2 -0.1
0.8 0.1 0.4 0.0 0.7 1.3 0.8 -0.4 1.4 0.7 0.7 1.5 1.3 1.8 6.5 6.1 4.7 2.0 2.7 1.2 0.9 1.8 2.4 2.4 2.7 2.5 2.3 1.2 1.7 2.3 2.2 2.1 1.6 2.3 0.4 1.0
0.7 0.6 1.2 2.0 2.1 0.7 0.1 0.9 0.3 0.9 1.0 1.3 1.6 1.0 -0.3 1.7 1.7 1.2 0.8 0.1 1.1 2.3 3.5 5.2 5.2 3.0 2.8 2.1 1.0 0.6 0.3 0.9 0.8 2.4 2.5 1.1
2.2 2.9 1.8 1.9 1.5 0.5 0.1 0.5 0.4 0.6 0.2 0.4 0.1 0.3 -0.3 0.1 1.2 2.7 1.8 1.3 0.7 0.0 3.7 3.6 4.0 3.3 4.8 2.7 1.5 0.4 0.6 0.2 0.5 1.2 1.8 0.8
2.1 1.3 2.0 1.5 0.7 0.8 0.5 0.6 1.6 1.9 0.4 0.6 1.4 1.1 0.6 1.9 5.3 2.5 2.6 1.9 1.5 1.7 2.3 2.1 3.2 3.4 2.9 3.1 2.3 1.5 0.3 1.6 1.1 1.1 0.9 0.5
1.6 0.9 0.8 -0.3 -0.3 1.2 3.4 1.0 -0.9 1.3 0.0 1.9 1.1 1.9 1.5 1.3 3.3 1.9 1.9 1.2 2.7 6.0 2.1 2.1 1.9 1.4 1.1 0.7 1.1 -0.1 1.4 -0.8 0.9 2.1 -0.7 0.0
-0.2 -0.3 0.1 -0.1 0.4 0.8 1.0 2.1 0.6 -0.5 -1.2 -1.9 0.1 -0.4 0.2 -0.6 -1.5 -0.9 1.1 0.3 -0.3 -1.5 -5.5 -6.4 -5.4 -4.4 1.0 0.4 -4.0 -5.3 -0.5 -3.0 -5.8 -3.4 -1.7 -1.9
-1.6 0.7 0.7 0.4 0.3 1.6 0.6 -0.1 -0.5 -0.3 -1.0 -0.7 -0.7 -1.8 -1.3 -0.5 -0.1 -0.9 -1.1 -1.7 -1.7 -1.1 -2.9 -7.6 -9.2 -8.2 -5.4 -4.4 -5.5 -7.3 -2.8 -1.3 -1.0 -1.3 -2.9 -1.7
-1.1 0.5 0.9 1.1 0.9 -0.3 1.7 -2.0 -2.0 -1.7 -1.4 -0.3 -0.5 -2.4 -1.5 -1.2 -0.3 -0.1 -0.9 -0.8 -1.4 -1.7 -1.7 -3.3 -3.6 -3.2 -2.8 -1.8 -1.8 -2.3 -1.8 -0.5 -0.4 -1.9 -1.4 -0.8
-4.0 -1.9 -1.4 -1.5 -1.0 -0.8 -1.5 -1.6 -1.6 -1.3 -1.6 -3.0 -4.3 -3.5 -2.0 -1.5
-0.8 -2.3 -1.2 -0.2 -1.9 -1.8 -3.4

Figure 24. SATOB 101 - 400 hPa mean RMS O-B vector differences (ms-1). JULY 2003
All observations
Values are plotted where greater than 10 obs are present


150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
4.5 5.4 5.2 5.3 6.3 5.3 4.0 7.8 6.7 6.3 10.7 8.5 10.2 7.3 6.0 6.8
5.8 5.6 4.6 4.8 5.0 5.3 6.2 5.8 5.5 6.1 5.9 5.9 5.6 6.0 7.5 8.2 7.8 7.1 6.0 6.0 6.3 6.7 6.6 6.1 6.0 5.8 5.8 5.9 4.7 5.1 4.8 7.7 6.2 7.0
5.7 5.0 4.6 4.9 4.6 4.9 6.0 6.1 6.6 6.8 5.7 5.8 5.5 5.9 6.8 7.4 7.2 7.0 7.8 6.9 6.4 7.2 13.3 10.6 8.7 8.3 7.6 7.2 7.7 8.9 7.5 6.9 6.2 6.2 6.9 6.7
4.9 4.8 4.3 5.0 4.9 4.6 4.7 4.8 4.9 5.3 6.2 4.9 4.6 4.6 5.2 6.4 8.0 6.7 6.2 7.7 9.5 18.0 17.2 10.0 8.4 8.0 8.2 7.9 7.6 6.6 7.0 6.6 6.3 6.5 6.3 5.1
5.0 4.9 4.6 5.3 4.2 5.0 5.7 4.9 5.0 4.7 4.9 5.4 4.8 8.5 17.7 16.9 11.8 6.6 7.3 6.3 6.2 6.5 7.8 7.5 7.9 6.8 6.9 6.1 6.0 6.2 5.7 5.2 5.0 5.4 4.9 5.4
5.7 4.9 4.7 6.4 6.0 4.8 4.8 5.1 5.2 5.5 5.9 4.9 5.6 5.1 5.0 6.4 7.2 7.6 7.4 7.0 8.0 9.4 10.7 12.3 10.4 9.6 9.4 7.8 7.2 6.3 5.8 4.8 5.4 5.3 6.0 5.5
5.7 5.9 5.5 6.1 6.9 5.3 4.9 5.5 6.1 6.4 5.8 4.9 5.3 5.3 5.6 7.0 9.0 8.9 7.9 7.6 7.4 8.8 11.3 9.6 9.0 8.4 9.1 7.0 6.7 6.1 6.1 4.9 4.4 4.5 4.5 4.4
5.4 5.3 5.7 6.8 6.3 4.6 4.2 7.1 7.9 6.8 6.4 5.9 7.2 8.7 6.9 11.8 12.4 12.2 8.7 7.9 7.5 8.9 8.3 7.9 8.3 7.4 7.1 7.2 7.3 7.0 7.0 6.0 4.9 4.6 4.7 4.2
5.5 5.2 5.1 6.4 5.7 6.1 7.3 8.0 6.2 6.5 7.1 7.3 7.0 7.8 9.7 10.3 10.6 10.6 16.2 11.1 11.4 15.1 9.7 8.4 7.4 7.6 7.4 8.1 12.9 10.4 6.9 5.1 5.9 7.2 6.3 5.6
8.2 6.9 6.2 5.7 5.3 6.0 6.0 6.5 6.4 7.4 8.2 7.4 8.8 7.8 7.3 8.0 9.6 8.6 9.0 9.1 10.2 10.2 18.9 17.8 14.7 14.4 11.2 14.5 15.8 12.8 10.4 9.1 14.0 12.2 9.5 9.1
8.3 7.3 6.8 6.5 5.9 7.9 7.9 6.6 6.3 6.1 6.7 7.9 9.4 10.4 8.8 7.6 7.9 8.8 8.8 9.5 9.8 9.9 11.3 14.5 18.1 17.1 15.2 15.5 15.3 15.3 8.1 7.3 6.1 6.9 8.9 6.8
6.8 5.9 6.2 7.7 6.7 5.9 8.5 6.8 7.3 7.0 5.8 6.5 6.3 10.3 10.0 9.2 9.4 7.9 8.7 7.9 8.2 8.5 8.6 11.1 11.2 10.7 9.8 8.9 8.8 8.6 6.8 5.7 5.0 6.1 6.1 4.9
8.2 9.6 9.1 8.2 8.2 8.8 9.1 9.2 8.9 9.3 9.4 11.4 11.9 10.4 9.2 9.6
9.7 7.5 6.9 7.1 9.3 12.5 12.8

MONITORING OF SATELLITE TEMPERATURES

MONITORING CENTRE: BRACKNELL

MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from NOAA-15, NOAA-16 and NOAA-17.

Standard of comparison :Background field from UKMO global model.

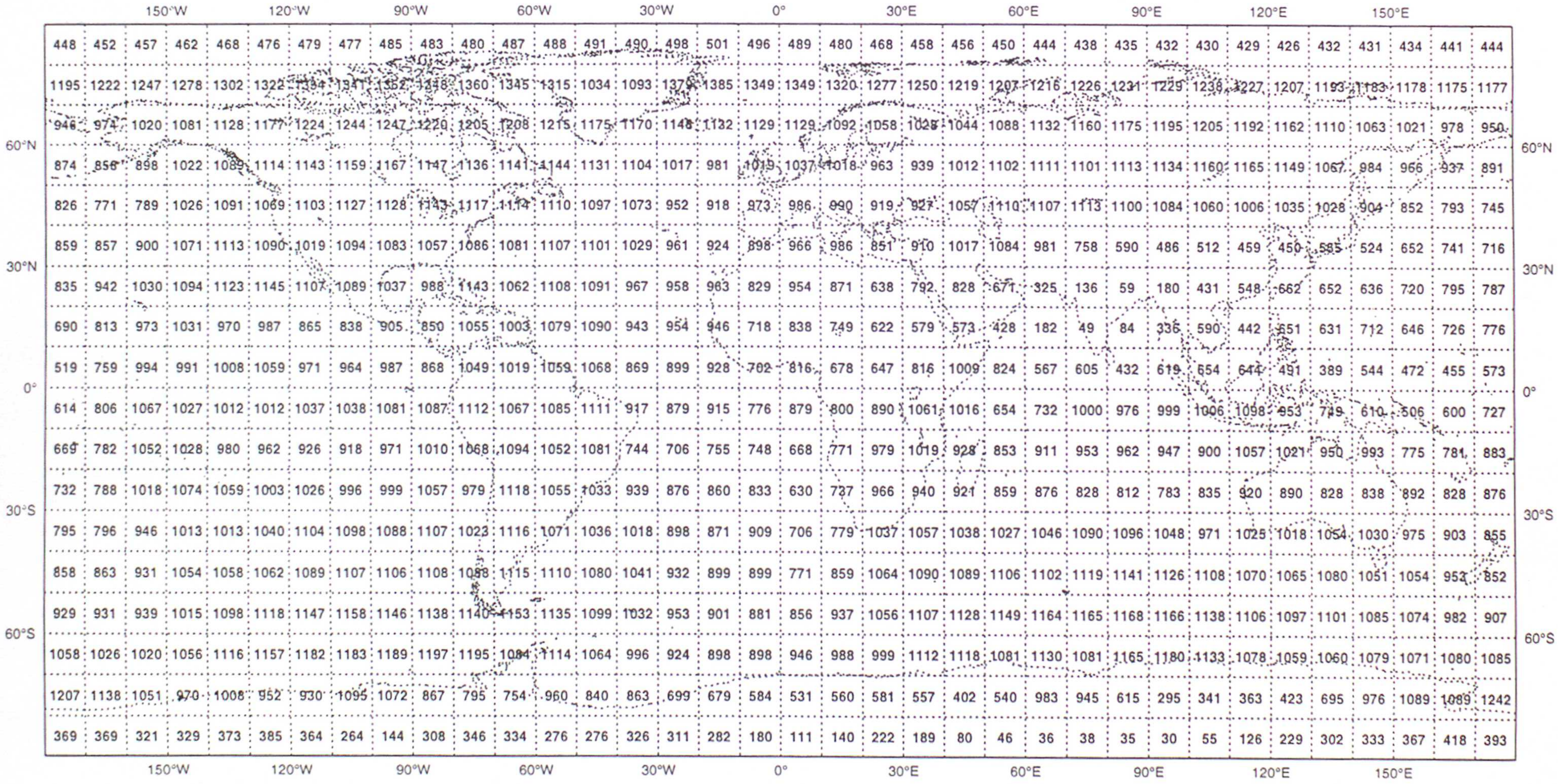
Selection Criteria :All soundings.

Data Extracted :Sounding channels (and approximate weighting function peaks, hPa)

HIRS8 (Surface)
HIRS15 (700)
HIRS11 (500-700)
HIRS4 (400)
AMSUA5 (700)
AMSUA7 (300)
AMSUA9 (100)

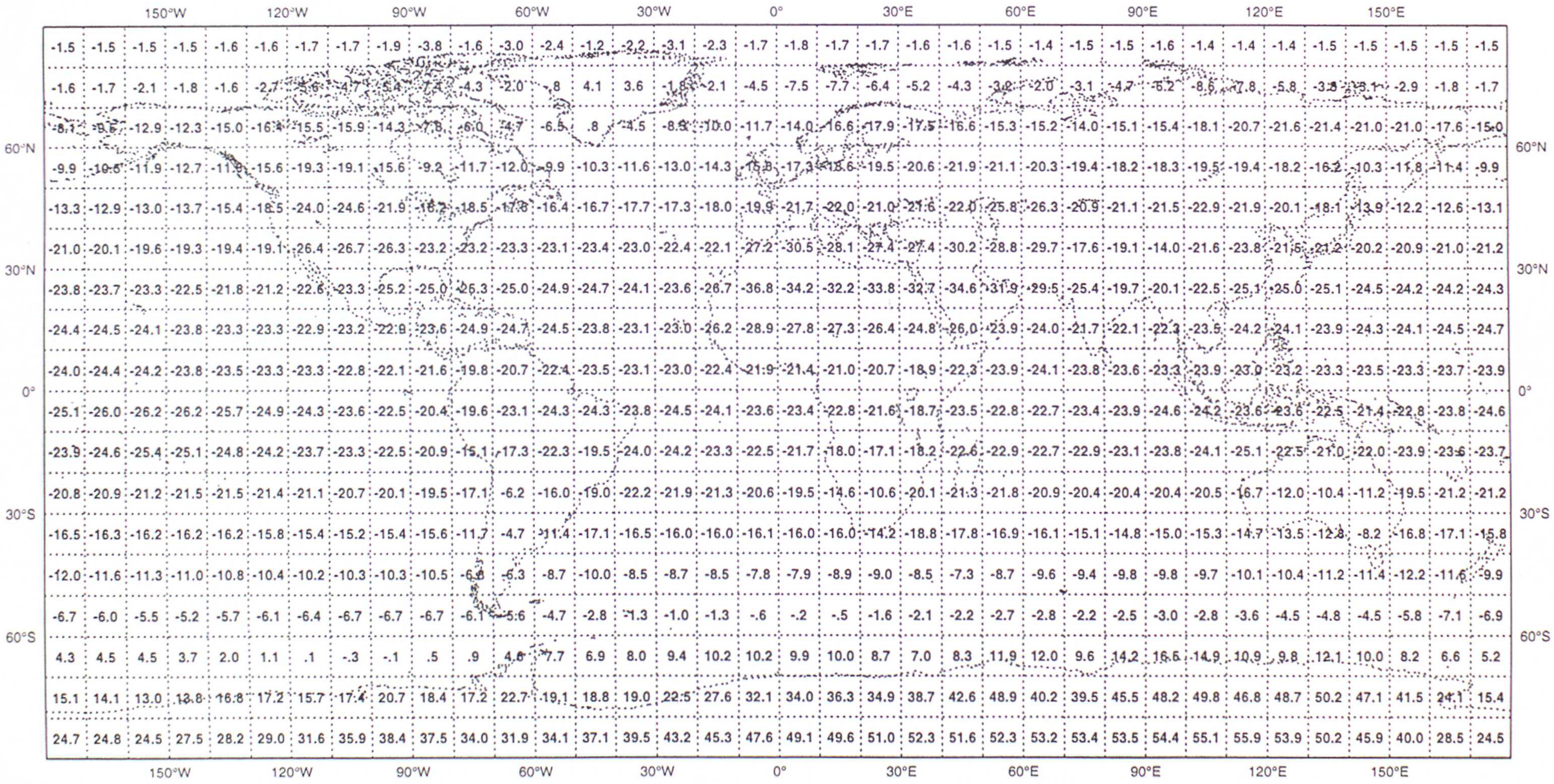
:Mean and standard deviation observation-minus-background brightness temperature differences

Figure 25. ATOVS mean daily count. JULY 2003
NOAA15, using all observations
Global average number of observations in 24 hours = 577431



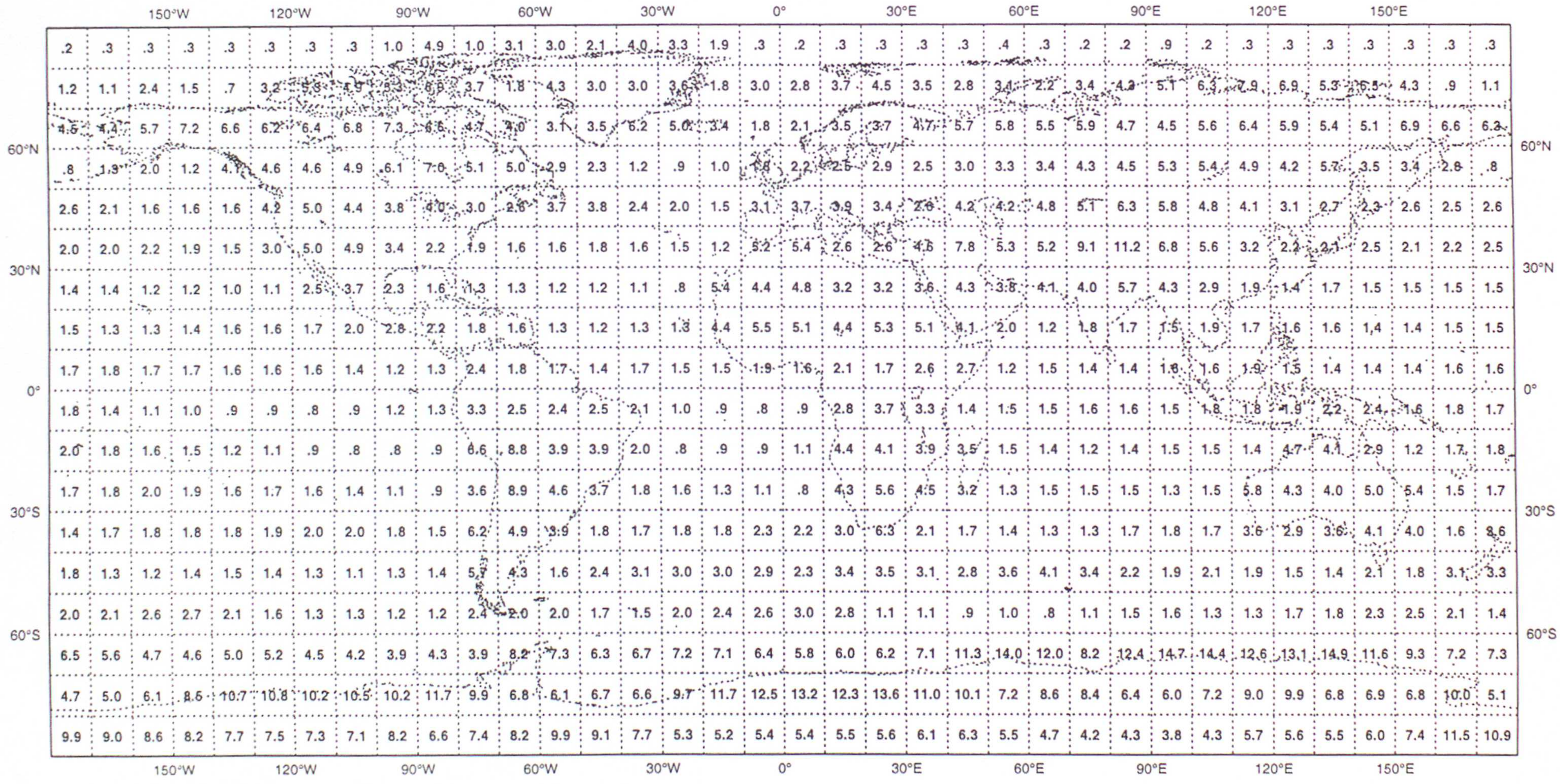
448	452	457	462	468	476	479	477	485	483	480	487	488	491	490	498	501	496	489	480	468	458	456	450	444	438	435	432	430	429	426	432	431	434	441	444
1195	1222	1247	1278	1302	1322	1334	1341	1352	1348	1360	1345	1315	1034	1093	1379	1385	1349	1349	1320	1277	1250	1219	1207	1216	1226	1231	1229	1238	1227	1207	1193	1183	1178	1175	1177
946	974	1020	1081	1128	1177	1224	1244	1247	1220	1205	1208	1215	1175	1170	1148	1132	1129	1129	1092	1058	1028	1044	1088	1132	1160	1175	1195	1205	1192	1162	1110	1063	1021	978	950
874	856	898	1022	1089	1114	1143	1159	1167	1147	1136	1141	1144	1131	1104	1017	981	1019	1037	1018	963	939	1012	1102	1111	1101	1113	1134	1160	1165	1149	1067	984	966	937	891
826	771	789	1026	1091	1069	1103	1127	1128	1143	1117	1114	1110	1097	1073	952	918	973	986	990	919	927	1057	1110	1107	1113	1100	1084	1060	1006	1035	1028	904	852	793	745
859	857	900	1071	1113	1090	1019	1094	1083	1057	1086	1081	1107	1101	1029	961	924	898	966	986	851	910	1017	1084	981	758	590	486	512	459	450	585	524	652	741	716
835	942	1030	1094	1123	1145	1107	1089	1037	988	1143	1062	1108	1091	967	958	963	829	954	871	638	792	828	671	325	136	59	180	431	548	662	652	636	720	795	787
690	813	973	1031	970	987	865	838	905	850	1055	1003	1079	1090	943	954	946	718	838	749	622	579	573	428	182	49	84	336	590	442	651	631	712	646	726	776
519	759	994	991	1008	1059	971	964	987	868	1049	1019	1059	1068	869	899	928	702	816	678	647	816	1009	824	567	605	432	619	654	644	491	389	544	472	455	573
614	806	1067	1027	1012	1012	1037	1038	1081	1087	1112	1067	1085	1111	917	879	915	776	879	800	890	1061	1016	654	732	1000	976	999	1006	1098	953	749	610	506	600	727
669	782	1052	1028	980	962	926	918	971	1010	1068	1094	1052	1081	744	706	755	748	668	771	979	1019	928	853	911	953	962	947	900	1057	1021	950	993	775	781	883
732	788	1018	1074	1059	1003	1026	996	999	1057	979	1118	1055	1033	939	876	860	833	630	737	966	940	921	859	876	828	812	783	835	920	890	828	838	892	828	876
795	796	946	1013	1013	1040	1104	1098	1088	1107	1023	1116	1071	1036	1018	898	871	909	706	779	1037	1057	1038	1027	1046	1090	1096	1048	971	1025	1018	1054	1030	975	903	855
858	863	931	1054	1058	1062	1089	1107	1106	1108	1088	1115	1110	1080	1041	932	899	899	771	859	1064	1090	1089	1106	1102	1119	1141	1126	1108	1070	1065	1080	1051	1054	953	852
929	931	939	1015	1098	1118	1147	1158	1146	1138	1140	1153	1135	1099	1032	953	901	881	856	937	1056	1107	1128	1149	1164	1165	1168	1166	1138	1106	1097	1101	1085	1074	982	907
1058	1026	1020	1056	1116	1157	1182	1183	1189	1197	1195	1084	1114	1064	996	924	898	898	946	988	999	1112	1118	1081	1130	1081	1165	1180	1133	1078	1059	1060	1079	1071	1080	1085
1207	1138	1051	970	1008	952	930	1095	1072	867	795	754	960	840	863	699	679	584	531	560	581	557	402	540	983	945	615	295	341	363	423	695	976	1089	1089	1242
369	369	321	329	373	385	364	264	144	308	346	334	276	276	326	311	282	180	111	140	222	189	80	46	36	38	35	30	55	126	229	302	333	367	418	393

Figure 26. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



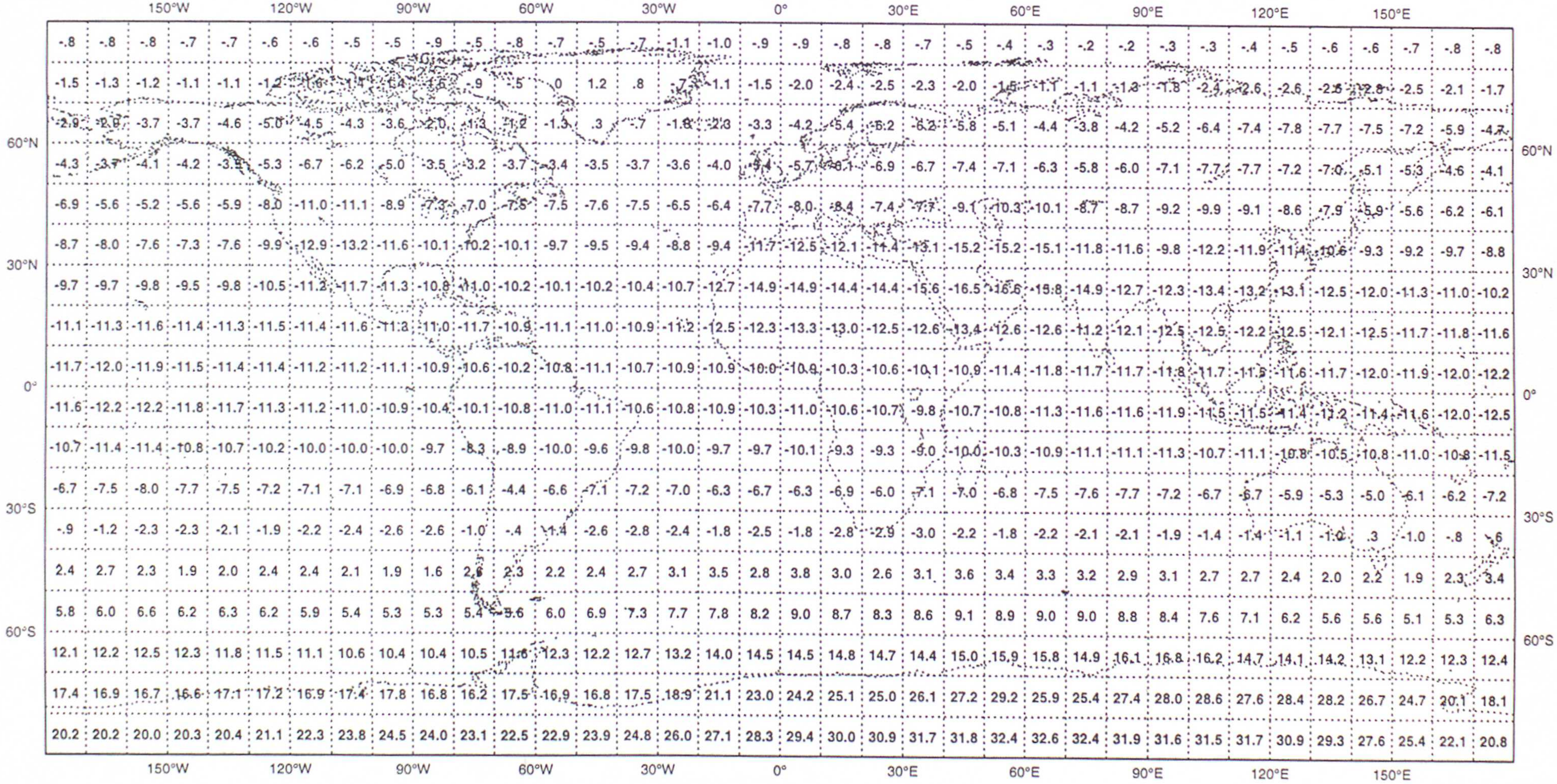
-1.5	-1.5	-1.5	-1.5	-1.6	-1.6	-1.7	-1.7	-1.9	-3.8	-1.6	-3.0	-2.4	-1.2	-2.2	-3.1	-2.3	-1.7	-1.8	-1.7	-1.7	-1.6	-1.6	-1.5	-1.4	-1.5	-1.5	-1.6	-1.4	-1.4	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5
-1.6	-1.7	-2.1	-1.8	-1.6	-2.7	-5.6	-4.7	-5.4	-7.4	-4.3	-2.0	-.8	4.1	3.6	-1.8	-2.1	-4.5	-7.5	-7.7	-6.4	-5.2	-4.3	-3.2	-2.0	-3.1	-4.7	-6.2	-8.6	-7.8	-5.8	-3.3	-5.1	-2.9	-1.8	-1.7
-8.1	-9.6	-12.9	-12.3	-15.0	-16.4	-15.5	-15.9	-14.3	-7.8	-6.0	-4.7	-6.5	.8	-4.5	-8.9	-10.0	-11.7	-14.0	-16.6	-17.9	-17.5	-16.6	-15.3	-15.2	-14.0	-15.1	-15.4	-18.1	-20.7	-21.6	-21.4	-21.0	-21.0	-17.6	-15.0
-9.9	-10.6	-11.9	-12.7	-11.9	-15.6	-19.3	-19.1	-15.6	-9.2	-11.7	-12.0	-9.9	-10.3	-11.6	-13.0	-14.3	-15.8	-17.3	-18.6	-19.5	-20.6	-21.9	-21.1	-20.3	-19.4	-18.2	-18.3	-19.5	-19.4	-18.2	-16.2	-10.3	-11.8	-11.4	-9.9
-13.3	-12.9	-13.0	-13.7	-15.4	-18.5	-24.0	-24.6	-21.9	-16.2	-18.5	-17.8	-16.4	-16.7	-17.7	-17.3	-18.0	-19.9	-21.7	-22.0	-21.0	-21.6	-22.0	-25.8	-26.3	-20.9	-21.1	-21.5	-22.9	-21.9	-20.1	-18.1	-13.9	-12.2	-12.6	-13.1
-21.0	-20.1	-19.6	-19.3	-19.4	-19.1	-26.4	-26.7	-26.3	-23.2	-23.2	-23.3	-23.1	-23.4	-23.0	-22.4	-22.1	-27.2	-30.5	-28.1	-27.4	-27.4	-30.2	-28.8	-29.7	-17.6	-19.1	-14.0	-21.6	-23.8	-21.5	-21.2	-20.2	-20.9	-21.0	-21.2
-23.8	-23.7	-23.3	-22.5	-21.8	-21.2	-22.6	-23.3	-25.2	-25.0	-26.3	-25.0	-24.9	-24.7	-24.1	-23.6	-26.7	-36.8	-34.2	-32.2	-33.8	-32.7	-34.6	-31.9	-29.5	-25.4	-19.7	-20.1	-22.5	-25.1	-25.0	-25.1	-24.5	-24.2	-24.2	-24.3
-24.4	-24.5	-24.1	-23.8	-23.3	-23.3	-22.9	-23.2	-22.9	-23.6	-24.9	-24.7	-24.5	-23.8	-23.1	-23.0	-26.2	-28.9	-27.8	-27.3	-26.4	-24.8	-26.0	-23.9	-24.0	-21.7	-22.1	-22.3	-23.5	-24.2	-24.1	-23.9	-24.3	-24.1	-24.5	-24.7
-24.0	-24.4	-24.2	-23.8	-23.5	-23.3	-23.3	-22.8	-22.1	-21.6	-19.8	-20.7	-22.4	-23.5	-23.1	-23.0	-22.4	-21.9	-21.4	-21.0	-20.7	-18.9	-22.3	-23.9	-24.1	-23.8	-23.6	-23.3	-23.9	-23.0	-23.2	-23.3	-23.5	-23.3	-23.7	-23.9
-25.1	-26.0	-26.2	-26.2	-25.7	-24.9	-24.3	-23.6	-22.5	-20.4	-19.6	-23.1	-24.3	-24.3	-23.8	-24.5	-24.1	-23.6	-23.4	-22.8	-21.6	-18.7	-23.5	-22.8	-22.7	-23.4	-23.9	-24.6	-24.2	-23.6	-23.6	-22.5	-21.4	-22.8	-23.8	-24.6
-23.9	-24.6	-25.4	-25.1	-24.8	-24.2	-23.7	-23.3	-22.5	-20.9	-15.1	-17.3	-22.3	-19.5	-24.0	-24.2	-23.3	-22.5	-21.7	-18.0	-17.1	-18.2	-22.6	-22.9	-22.7	-22.9	-23.1	-23.8	-24.1	-25.1	-22.5	-21.0	-22.0	-23.9	-23.6	-23.7
-20.8	-20.9	-21.2	-21.5	-21.5	-21.4	-21.1	-20.7	-20.1	-19.5	-17.1	-6.2	-16.0	-19.0	-22.2	-21.9	-21.3	-20.6	-19.5	-14.6	-10.6	-20.1	-21.3	-21.8	-20.9	-20.4	-20.4	-20.4	-20.5	-16.7	-12.0	-10.4	-11.2	-19.5	-21.2	-21.2
-16.5	-16.3	-16.2	-16.2	-16.2	-15.8	-15.4	-15.2	-15.4	-15.6	-11.7	-4.7	-11.4	-17.1	-16.5	-16.0	-16.0	-16.1	-16.0	-16.0	-14.2	-18.8	-17.8	-16.9	-16.1	-15.1	-14.8	-15.0	-15.3	-14.7	-13.5	-12.8	-8.2	-16.8	-17.1	-15.8
-12.0	-11.6	-11.3	-11.0	-10.8	-10.4	-10.2	-10.3	-10.3	-10.5	-6.8	-6.3	-8.7	-10.0	-8.5	-8.7	-8.5	-7.8	-7.9	-8.9	-9.0	-8.5	-7.3	-8.7	-9.6	-9.4	-9.8	-9.8	-9.7	-10.1	-10.4	-11.2	-11.4	-12.2	-11.6	-9.9
-6.7	-6.0	-5.5	-5.2	-5.7	-6.1	-6.4	-6.7	-6.7	-6.7	-6.1	-5.6	-4.7	-2.8	-1.3	-1.0	-1.3	-.6	-.2	-.5	-1.6	-2.1	-2.2	-2.7	-2.8	-2.2	-2.5	-3.0	-2.8	-3.6	-4.5	-4.8	-4.5	-5.8	-7.1	-6.9
4.3	4.5	4.5	3.7	2.0	1.1	.1	-.3	-.1	.5	.9	4.6	7.7	6.9	8.0	9.4	10.2	10.2	9.9	10.0	8.7	7.0	8.3	11.9	12.0	9.6	14.2	16.5	14.9	10.9	9.8	12.1	10.0	8.2	6.6	5.2
15.1	14.1	13.0	13.8	16.8	17.2	15.7	17.4	20.7	18.4	17.2	22.7	19.1	18.8	19.0	22.5	27.6	32.1	34.0	36.3	34.9	38.7	42.6	48.9	40.2	39.5	45.5	48.2	49.8	46.8	48.7	50.2	47.1	41.5	24.1	15.4
24.7	24.8	24.5	27.5	28.2	29.0	31.6	35.9	38.4	37.5	34.0	31.9	34.1	37.1	39.5	43.2	45.3	47.6	49.1	49.6	51.0	52.3	51.6	52.3	53.2	53.4	53.5	54.4	55.1	55.9	53.9	50.2	45.9	40.0	28.5	24.5

Figure 27. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA15, using all observations



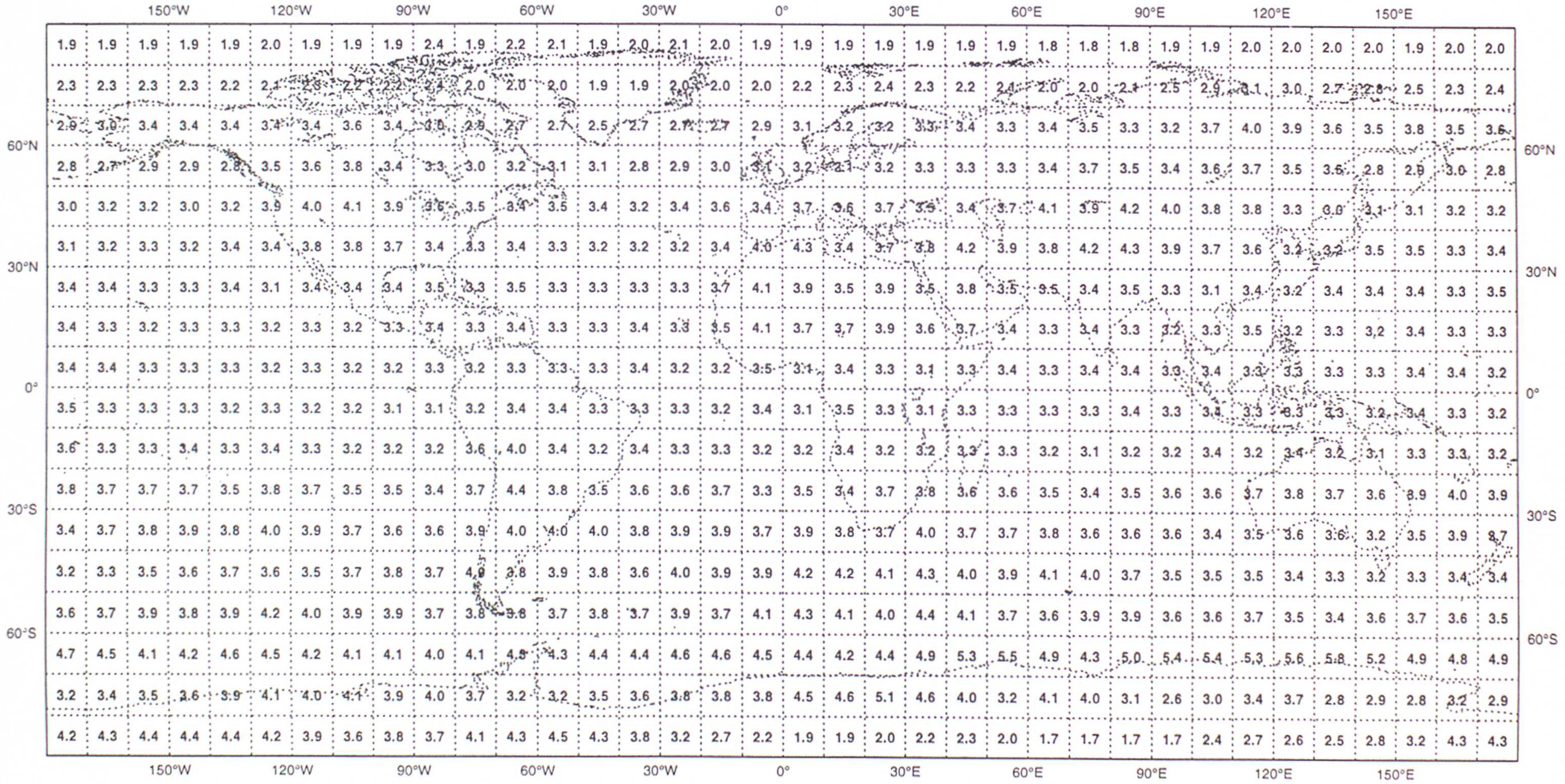
.2	.3	.3	.3	.3	.3	.3	.3	1.0	4.9	1.0	3.1	3.0	2.1	4.0	3.3	1.9	.3	.2	.3	.3	.3	.3	.4	.3	.2	.2	.9	.2	.3	.3	.3	.3	.3	.3	.3
1.2	1.1	2.4	1.5	.7	3.2	5.8	4.9	8.3	6.9	3.7	1.8	4.3	3.0	3.0	3.6	1.8	3.0	2.8	3.7	4.5	3.5	2.8	3.4	2.2	3.4	4.3	5.1	6.3	7.9	6.9	5.3	6.5	4.3	.9	1.1
4.5	4.4	5.7	7.2	6.6	6.2	6.4	6.8	7.3	6.6	4.7	4.0	3.1	3.5	6.2	5.0	3.4	1.8	2.1	3.5	3.7	4.7	5.7	5.8	5.5	5.9	4.7	4.5	5.6	6.4	5.9	5.4	5.1	6.9	6.6	6.3
.8	1.9	2.0	1.2	4.1	4.6	4.6	4.9	6.1	7.0	5.1	5.0	2.9	2.3	1.2	.9	1.0	1.8	2.2	2.5	2.9	2.5	3.0	3.3	3.4	4.3	4.5	5.3	5.4	4.9	4.2	5.7	3.5	3.4	2.8	.8
2.6	2.1	1.6	1.6	1.6	4.2	5.0	4.4	3.8	4.0	3.0	2.6	3.7	3.8	2.4	2.0	1.5	3.1	3.7	3.9	3.4	2.6	4.2	4.2	4.8	5.1	6.3	5.8	4.8	4.1	3.1	2.7	2.3	2.6	2.5	2.6
2.0	2.0	2.2	1.9	1.5	3.0	5.0	4.9	3.4	2.2	1.9	1.6	1.6	1.8	1.6	1.5	1.2	5.2	5.4	2.6	2.6	4.6	7.8	5.3	5.2	9.1	11.2	6.8	5.6	3.2	2.2	2.1	2.5	2.1	2.2	2.5
1.4	1.4	1.2	1.2	1.0	1.1	2.5	3.7	2.3	1.6	1.3	1.3	1.2	1.2	1.1	.8	5.4	4.4	4.8	3.2	3.2	3.6	4.3	3.8	4.1	4.0	5.7	4.3	2.9	1.9	1.4	1.7	1.5	1.5	1.5	1.5
1.5	1.3	1.3	1.4	1.6	1.6	1.7	2.0	2.8	2.2	1.8	1.6	1.3	1.2	1.3	1.3	4.4	5.5	5.1	4.4	5.3	5.1	4.1	2.0	1.2	1.8	1.7	1.5	1.9	1.7	1.6	1.6	1.4	1.4	1.5	1.5
1.7	1.8	1.7	1.7	1.6	1.6	1.6	1.4	1.2	1.3	2.4	1.8	1.7	1.4	1.7	1.5	1.5	1.9	1.6	2.1	1.7	2.6	2.7	1.2	1.5	1.4	1.4	1.8	1.6	1.9	1.5	1.4	1.4	1.4	1.6	1.6
1.8	1.4	1.1	1.0	.9	.9	.8	.9	1.2	1.3	3.3	2.5	2.4	2.5	2.1	1.0	.9	.8	.9	2.8	3.7	3.3	1.4	1.5	1.5	1.6	1.6	1.5	1.8	1.8	1.9	2.2	2.4	1.6	1.8	1.7
2.0	1.8	1.6	1.5	1.2	1.1	.9	.8	.8	.9	6.6	8.8	3.9	3.9	2.0	.8	.9	.9	1.1	4.4	4.1	3.9	3.5	1.5	1.4	1.2	1.4	1.5	1.5	1.4	4.7	4.1	2.9	1.2	1.7	1.8
1.7	1.8	2.0	1.9	1.6	1.7	1.6	1.4	1.1	.9	3.6	8.9	4.6	3.7	1.8	1.6	1.3	1.1	.8	4.3	5.6	4.5	3.2	1.3	1.5	1.5	1.5	1.3	1.5	5.8	4.3	4.0	5.0	5.4	1.5	1.7
1.4	1.7	1.8	1.8	1.8	1.9	2.0	2.0	1.8	1.5	6.2	4.9	3.9	1.8	1.7	1.8	1.8	2.3	2.2	3.0	6.3	2.1	1.7	1.4	1.3	1.3	1.7	1.8	1.7	3.6	2.9	3.6	4.1	4.0	1.6	8.6
1.8	1.3	1.2	1.4	1.5	1.4	1.3	1.1	1.3	1.4	5.7	4.3	1.6	2.4	3.1	3.0	3.0	2.9	2.3	3.4	3.5	3.1	2.8	3.6	4.1	3.4	2.2	1.9	2.1	1.9	1.5	1.4	2.1	1.8	3.1	3.3
2.0	2.1	2.6	2.7	2.1	1.6	1.3	1.3	1.2	1.2	2.4	2.0	2.0	1.7	1.5	2.0	2.4	2.6	3.0	2.8	1.1	1.1	.9	1.0	.8	1.1	1.5	1.6	1.3	1.3	1.7	1.8	2.3	2.5	2.1	1.4
6.5	5.6	4.7	4.6	5.0	5.2	4.5	4.2	3.9	4.3	3.9	8.2	7.3	6.3	6.7	7.2	7.1	6.4	5.8	6.0	6.2	7.1	11.3	14.0	12.0	8.2	12.4	14.7	14.4	12.6	13.1	14.9	11.6	9.3	7.2	7.3
4.7	5.0	6.1	8.6	10.7	10.8	10.2	10.5	10.2	11.7	9.9	6.8	6.1	6.7	6.6	9.7	11.7	12.5	13.2	12.3	13.6	11.0	10.1	7.2	8.6	8.4	6.4	6.0	7.2	9.0	9.9	6.8	6.9	6.8	10.0	5.1
9.9	9.0	8.6	8.2	7.7	7.5	7.3	7.1	8.2	6.6	7.4	8.2	9.9	9.1	7.7	5.3	5.2	5.4	5.4	5.5	5.6	6.1	6.3	5.5	4.7	4.2	4.3	3.8	4.3	5.7	5.6	5.5	6.0	7.4	11.5	10.9

Figure 28. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



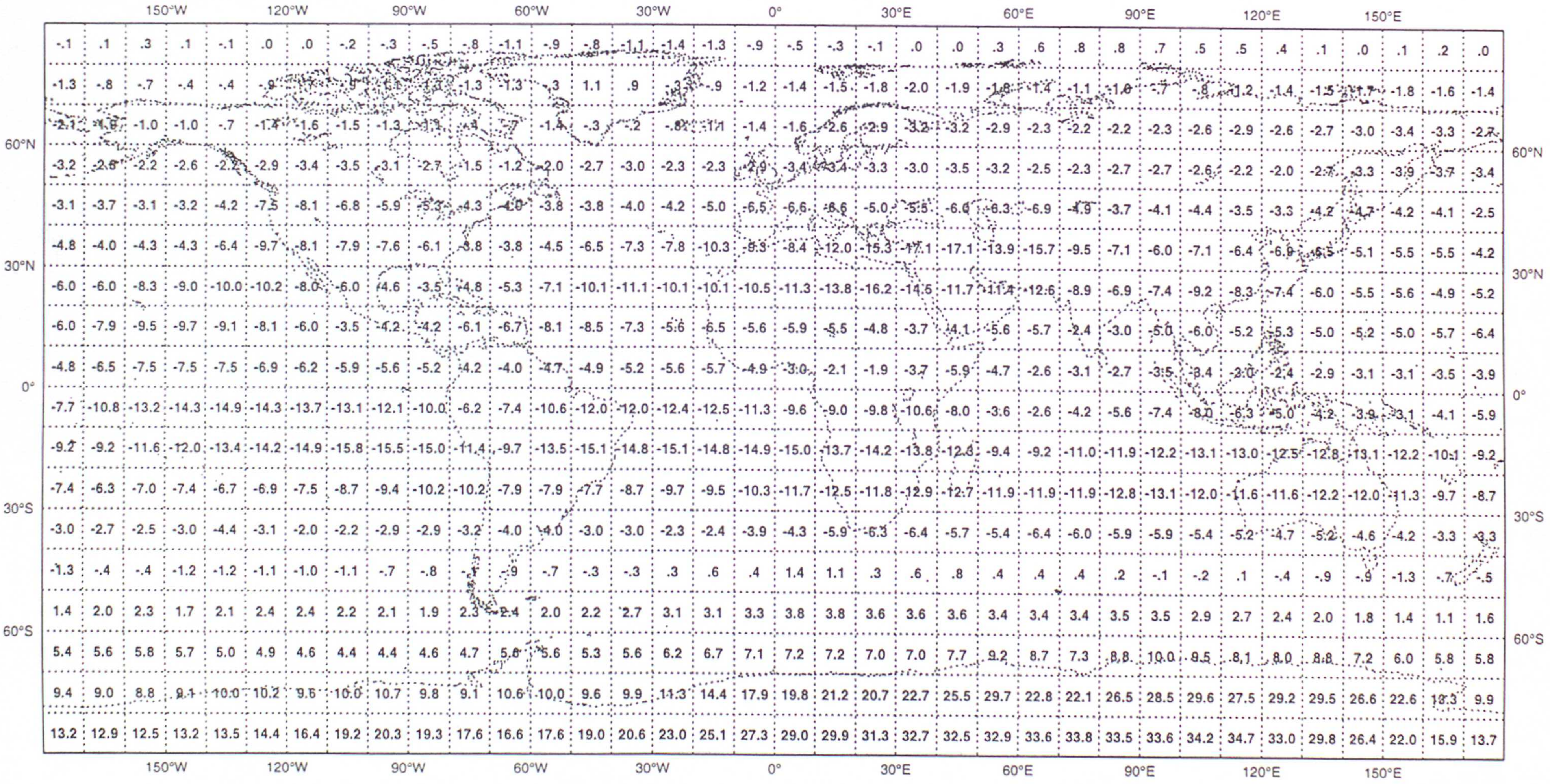
-.8	-.8	-.8	-.7	-.7	-.6	-.6	-.5	-.5	-.9	-.5	-.8	-.7	-.5	-.7	-1.1	-1.0	-.9	-.9	-.8	-.8	-.7	-.5	-.4	-.3	-.2	-.2	-.3	-.3	-.4	-.5	-.6	-.6	-.7	-.8	-.8
-1.5	-1.3	-1.2	-1.1	-1.1	-1.2	-1.6	-1.4	-1.4	-1.5	-.9	-.5	0	1.2	.8	-.7	-1.1	-1.5	-2.0	-2.4	-2.5	-2.3	-2.0	-1.5	-1.1	-1.1	-1.3	-1.8	-2.4	-2.6	-2.6	-2.5	-2.8	-2.5	-2.1	-1.7
-2.9	-2.8	-3.7	-3.7	-4.6	-5.0	-4.5	-4.3	-3.6	-2.0	-1.3	-1.2	-1.3	.3	-.7	-1.8	-2.3	-3.3	-4.2	-5.4	-6.2	-6.2	-5.8	-5.1	-4.4	-3.8	-4.2	-5.2	-6.4	-7.4	-7.8	-7.7	-7.5	-7.2	-5.9	-4.7
-4.3	-3.7	-4.1	-4.2	-3.5	-5.3	-6.7	-6.2	-5.0	-3.5	-3.2	-3.7	-3.4	-3.5	-3.7	-3.6	-4.0	-5.4	-5.7	-6.1	-6.9	-6.7	-7.4	-7.1	-6.3	-5.8	-6.0	-7.1	-7.7	-7.7	-7.2	-7.0	-5.1	-5.3	-4.6	-4.1
-6.9	-5.6	-5.2	-5.6	-5.9	-8.0	-11.0	-11.1	-8.9	-7.3	-7.0	-7.5	-7.5	-7.6	-7.5	-6.5	-6.4	-7.7	-8.0	-8.4	-7.4	-7.7	-9.1	-10.3	-10.1	-8.7	-8.7	-9.2	-9.9	-9.1	-8.6	-7.9	-5.9	-5.6	-6.2	-6.1
-8.7	-8.0	-7.6	-7.3	-7.6	-9.9	-12.9	-13.2	-11.6	-10.1	-10.2	-10.1	-9.7	-9.5	-9.4	-8.8	-9.4	-11.7	-12.5	-12.1	-11.4	-13.1	-15.2	-15.2	-15.1	-11.8	-11.6	-9.8	-12.2	-11.9	-11.4	-10.6	-9.3	-9.2	-9.7	-8.8
-9.7	-9.7	-9.8	-9.5	-9.8	-10.5	-11.2	-11.7	-11.3	-10.8	-11.0	-10.2	-10.1	-10.2	-10.4	-10.7	-12.7	-14.9	-14.9	-14.4	-14.4	-15.6	-16.5	-16.6	-15.8	-14.9	-12.7	-12.3	-13.4	-13.2	-13.1	-12.5	-12.0	-11.3	-11.0	-10.2
-11.1	-11.3	-11.6	-11.4	-11.3	-11.5	-11.4	-11.6	-11.3	-11.0	-11.7	-10.9	-11.1	-11.0	-10.9	-11.2	-12.5	-12.3	-13.3	-13.0	-12.5	-12.6	-13.4	-12.6	-12.6	-11.2	-12.1	-12.5	-12.5	-12.2	-12.5	-12.1	-12.5	-11.7	-11.8	-11.6
-11.7	-12.0	-11.9	-11.5	-11.4	-11.4	-11.2	-11.2	-11.1	-10.9	-10.6	-10.2	-10.8	-11.1	-10.7	-10.9	-10.9	-10.0	-10.9	-10.3	-10.6	-10.1	-10.9	-11.4	-11.8	-11.7	-11.7	-11.8	-11.7	-11.5	-11.6	-11.7	-12.0	-11.9	-12.0	-12.2
-11.6	-12.2	-12.2	-11.8	-11.7	-11.3	-11.2	-11.0	-10.9	-10.4	-10.1	-10.8	-11.0	-11.1	-10.6	-10.8	-10.9	-10.3	-11.0	-10.6	-10.7	-9.8	-10.7	-10.8	-11.3	-11.6	-11.6	-11.9	-11.5	-11.5	-11.4	-11.2	-11.4	-11.6	-12.0	-12.5
-10.7	-11.4	-11.4	-10.8	-10.7	-10.2	-10.0	-10.0	-10.0	-9.7	-8.3	-8.9	-10.0	-9.6	-9.8	-10.0	-9.7	-9.7	-10.1	-9.3	-9.3	-9.0	-10.0	-10.3	-10.9	-11.1	-11.1	-11.3	-10.7	-11.1	-10.8	-10.5	-10.8	-11.0	-10.8	-11.5
-6.7	-7.5	-8.0	-7.7	-7.5	-7.2	-7.1	-7.1	-6.9	-6.8	-6.1	-4.4	-6.6	-7.1	-7.2	-7.0	-6.3	-6.7	-6.3	-6.9	-6.0	-7.1	-7.0	-6.8	-7.5	-7.6	-7.7	-7.2	-6.7	-6.7	-5.9	-5.3	-5.0	-6.1	-6.2	-7.2
-.9	-1.2	-2.3	-2.3	-2.1	-1.9	-2.2	-2.4	-2.6	-2.6	-1.0	-.4	-1.4	-2.6	-2.8	-2.4	-1.8	-2.5	-1.8	-2.8	-2.9	-3.0	-2.2	-1.8	-2.2	-2.1	-2.1	-1.9	-1.4	-1.4	-1.1	-1.0	.3	-1.0	-.8	-.6
2.4	2.7	2.3	1.9	2.0	2.4	2.4	2.1	1.9	1.6	2.6	2.3	2.2	2.4	2.7	3.1	3.5	2.8	3.8	3.0	2.6	3.1	3.6	3.4	3.3	3.2	2.9	3.1	2.7	2.7	2.4	2.0	2.2	1.9	2.3	3.4
5.8	6.0	6.6	6.2	6.3	6.2	5.9	5.4	5.3	5.3	5.4	5.6	6.0	6.9	7.3	7.7	7.8	8.2	9.0	8.7	8.3	8.6	9.1	8.9	9.0	9.0	8.8	8.4	7.6	7.1	6.2	5.6	5.6	5.1	5.3	6.3
12.1	12.2	12.5	12.3	11.8	11.5	11.1	10.6	10.4	10.4	10.5	11.6	12.3	12.2	12.7	13.2	14.0	14.5	14.5	14.8	14.7	14.4	15.0	15.9	15.8	14.9	16.1	16.8	16.2	14.7	14.1	14.2	13.1	12.2	12.3	12.4
17.4	16.9	16.7	16.6	17.1	17.2	16.9	17.4	17.8	16.8	16.2	17.5	16.9	16.8	17.5	18.9	21.1	23.0	24.2	25.1	25.0	26.1	27.2	29.2	25.9	25.4	27.4	28.0	28.6	27.6	28.4	28.2	26.7	24.7	20.1	18.1
20.2	20.2	20.0	20.3	20.4	21.1	22.3	23.8	24.5	24.0	23.1	22.5	22.9	23.9	24.8	26.0	27.1	28.3	29.4	30.0	30.9	31.7	31.8	32.4	32.6	32.4	31.9	31.6	31.5	31.7	30.9	29.3	27.6	25.4	22.1	20.8

Figure 29. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA15, using all observations



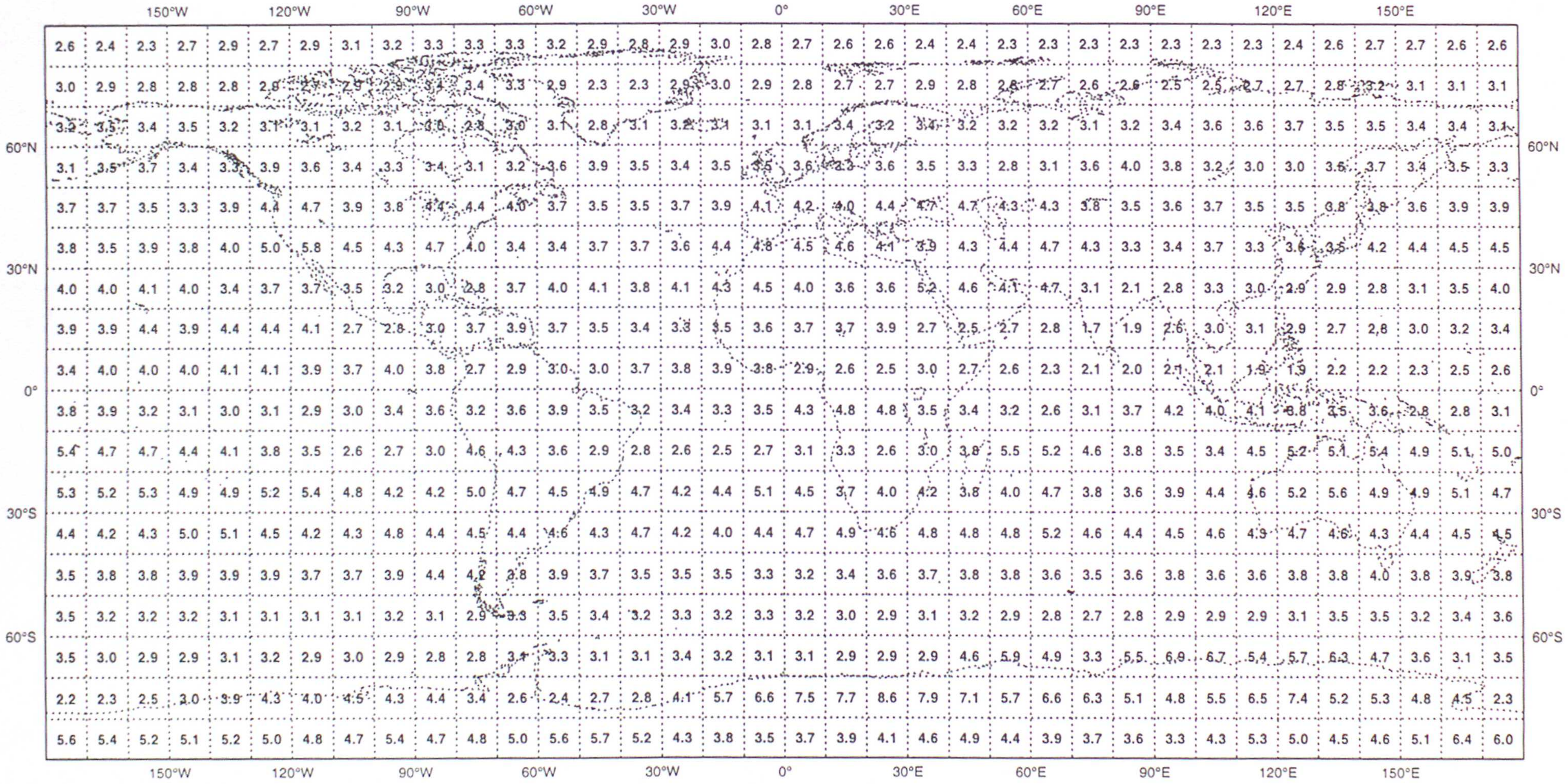
1.9	1.9	1.9	1.9	1.9	2.0	1.9	1.9	1.9	2.4	1.9	2.2	2.1	1.9	2.0	2.1	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.9	1.9	2.0	2.0	2.0	2.0	1.9	2.0	2.0
2.3	2.3	2.3	2.3	2.2	2.1	2.3	2.2	2.2	2.4	2.0	2.0	2.0	1.9	1.9	2.0	2.0	2.0	2.2	2.3	2.4	2.3	2.2	2.1	2.0	2.0	2.1	2.5	2.9	3.1	3.0	2.7	2.8	2.5	2.3	2.4
2.9	3.0	3.4	3.4	3.4	3.4	3.4	3.6	3.4	3.0	2.9	2.7	2.7	2.5	2.7	2.7	2.7	2.9	3.1	3.2	3.2	3.3	3.4	3.3	3.4	3.5	3.3	3.2	3.7	4.0	3.9	3.6	3.5	3.8	3.5	3.6
2.8	2.7	2.9	2.9	2.8	3.5	3.6	3.8	3.4	3.3	3.0	3.2	3.1	3.1	2.8	2.9	3.0	3.1	3.2	2.1	3.2	3.3	3.3	3.3	3.4	3.7	3.5	3.4	3.6	3.7	3.5	3.6	2.8	2.9	3.0	2.8
3.0	3.2	3.2	3.0	3.2	3.9	4.0	4.1	3.9	3.6	3.5	3.4	3.5	3.4	3.2	3.4	3.6	3.4	3.7	3.6	3.7	3.5	3.4	3.7	4.1	3.9	4.2	4.0	3.8	3.8	3.3	3.0	3.1	3.1	3.2	3.2
3.1	3.2	3.3	3.2	3.4	3.4	3.8	3.8	3.7	3.4	3.3	3.4	3.3	3.2	3.2	3.2	3.4	4.0	4.3	3.4	3.7	3.8	4.2	3.9	3.8	4.2	4.3	3.9	3.7	3.6	3.2	3.2	3.5	3.5	3.3	3.4
3.4	3.4	3.3	3.3	3.4	3.1	3.4	3.4	3.4	3.5	3.3	3.5	3.3	3.3	3.3	3.3	3.7	4.1	3.9	3.5	3.9	3.5	3.8	3.5	3.5	3.4	3.5	3.3	3.1	3.4	3.2	3.4	3.4	3.4	3.3	3.5
3.4	3.3	3.2	3.3	3.3	3.2	3.3	3.2	3.3	3.4	3.3	3.4	3.3	3.3	3.4	3.3	3.5	4.1	3.7	3.7	3.9	3.6	3.7	3.4	3.3	3.4	3.3	3.2	3.3	3.5	3.2	3.3	3.2	3.4	3.3	3.3
3.4	3.4	3.3	3.3	3.3	3.2	3.3	3.2	3.2	3.3	3.2	3.3	3.3	3.3	3.4	3.2	3.2	3.5	3.1	3.4	3.3	3.1	3.3	3.4	3.3	3.4	3.4	3.3	3.4	3.3	3.3	3.3	3.3	3.4	3.4	3.2
3.5	3.3	3.3	3.3	3.2	3.3	3.2	3.2	3.1	3.1	3.2	3.4	3.4	3.3	3.3	3.3	3.2	3.4	3.1	3.5	3.3	3.1	3.3	3.3	3.3	3.3	3.4	3.3	3.4	3.3	3.3	3.3	3.2	3.4	3.3	3.2
3.6	3.3	3.3	3.4	3.3	3.4	3.3	3.2	3.2	3.2	3.6	4.0	3.4	3.2	3.4	3.3	3.3	3.2	3.2	3.4	3.2	3.2	3.3	3.3	3.2	3.1	3.2	3.2	3.4	3.2	3.4	3.2	3.1	3.3	3.3	3.2
3.8	3.7	3.7	3.7	3.5	3.8	3.7	3.5	3.5	3.4	3.7	4.4	3.8	3.5	3.6	3.6	3.7	3.3	3.5	3.4	3.7	3.8	3.6	3.6	3.5	3.4	3.5	3.6	3.6	3.7	3.8	3.7	3.6	3.9	4.0	3.9
3.4	3.7	3.8	3.9	3.8	4.0	3.9	3.7	3.6	3.6	3.9	4.0	4.0	4.0	3.8	3.9	3.9	3.7	3.9	3.8	3.7	4.0	3.7	3.7	3.8	3.6	3.6	3.6	3.4	3.5	3.6	3.6	3.2	3.5	3.9	3.7
3.2	3.3	3.5	3.6	3.7	3.6	3.5	3.7	3.8	3.7	4.0	3.8	3.9	3.8	3.6	4.0	3.9	3.9	4.2	4.2	4.1	4.3	4.0	3.9	4.1	4.0	3.7	3.5	3.5	3.5	3.4	3.3	3.2	3.3	3.4	3.4
3.6	3.7	3.9	3.8	3.9	4.2	4.0	3.9	3.9	3.7	3.8	3.8	3.7	3.8	3.7	3.9	3.7	4.1	4.3	4.1	4.0	4.4	4.1	3.7	3.6	3.9	3.9	3.6	3.6	3.7	3.5	3.4	3.6	3.7	3.6	3.5
4.7	4.5	4.1	4.2	4.6	4.5	4.2	4.1	4.1	4.0	4.1	4.5	4.3	4.4	4.4	4.6	4.6	4.5	4.4	4.2	4.4	4.9	5.3	5.5	4.9	4.3	5.0	5.4	5.4	5.3	5.6	5.8	5.2	4.9	4.8	4.9
3.2	3.4	3.5	3.6	3.9	4.1	4.0	4.1	3.9	4.0	3.7	3.2	3.2	3.5	3.6	3.8	3.8	3.8	4.5	4.6	5.1	4.6	4.0	3.2	4.1	4.0	3.1	2.6	3.0	3.4	3.7	2.8	2.9	2.8	3.2	2.9
4.2	4.3	4.4	4.4	4.4	4.2	3.9	3.6	3.8	3.7	4.1	4.3	4.5	4.3	4.5	4.3	3.8	3.2	2.7	2.2	1.9	1.9	2.0	2.2	2.3	2.0	1.7	1.7	1.7	1.7	2.4	2.7	2.6	2.5	2.8	3.2	4.3	4.3

Figure 30. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



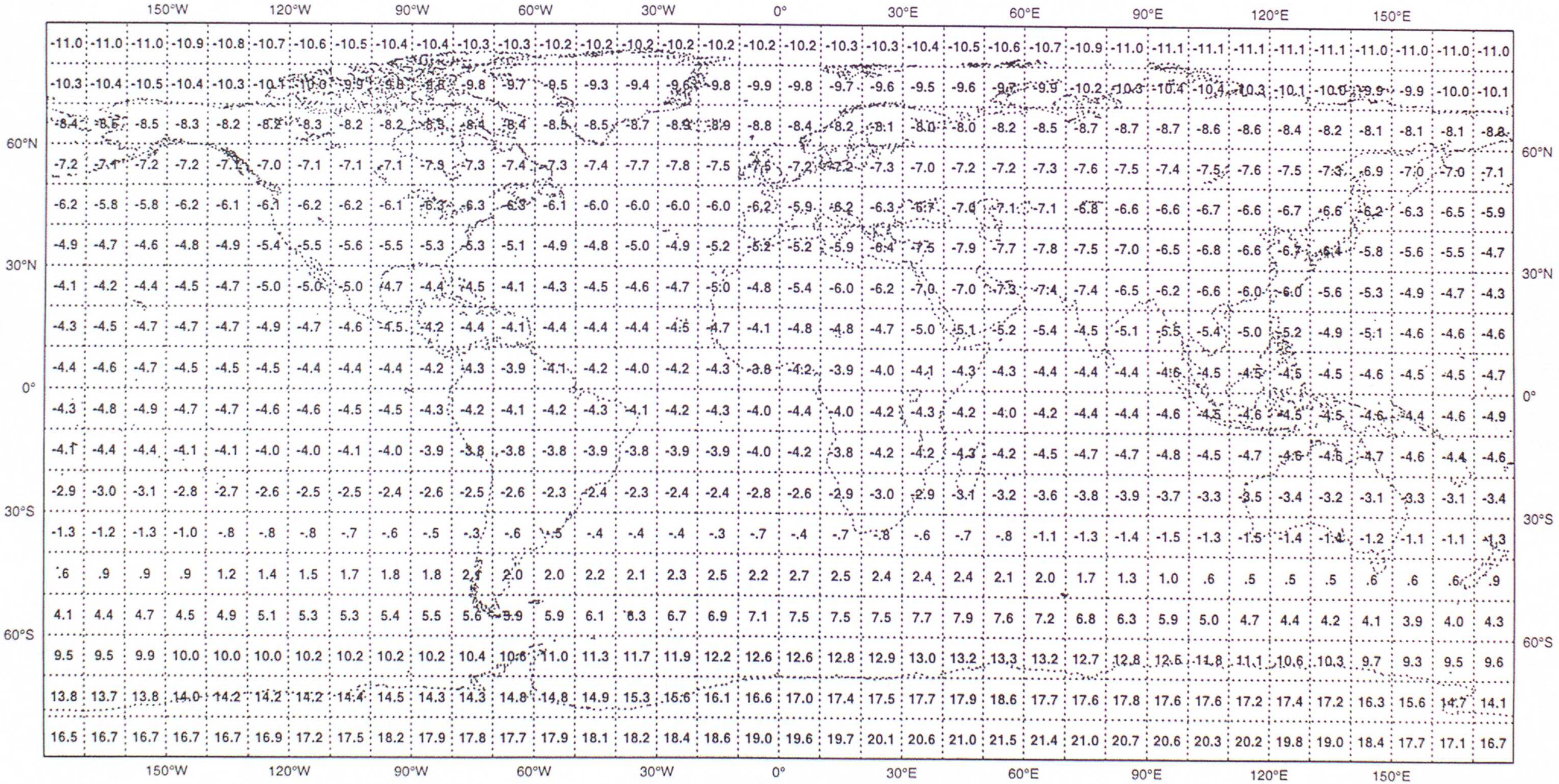
-.1	.1	.3	.1	-.1	.0	.0	-.2	-.3	-.5	-.8	-1.1	-.9	-.8	-1.1	-1.4	-1.3	-.9	-.5	-.3	-.1	.0	.0	.3	.6	.8	.8	.7	.5	.5	.4	.1	.0	.1	.2	.0
-1.3	-.8	-.7	-.4	-.4	-.9	-1.7	-.9	-1.1	-1.3	-1.3	-1.3	-.3	1.1	.9	-.3	-.9	-1.2	-1.4	-1.5	-1.8	-2.0	-1.9	-1.8	-1.4	-1.1	-1.0	-.7	-.8	-1.2	-1.4	-1.5	-1.7	-1.8	-1.6	-1.4
-2.1	-1.8	-1.0	-1.0	-.7	-1.4	-1.6	-1.5	-1.3	-1.1	-.4	-.7	-1.4	-.3	-.2	-.8	-1.1	-1.4	-1.6	-2.6	-2.9	-3.2	-3.2	-2.9	-2.3	-2.2	-2.2	-2.3	-2.6	-2.9	-2.6	-2.7	-3.0	-3.4	-3.3	-2.7
-3.2	-2.6	-2.2	-2.6	-2.2	-2.9	-3.4	-3.5	-3.1	-2.7	-1.5	-1.2	-2.0	-2.7	-3.0	-2.3	-2.3	-2.9	-3.4	-3.4	-3.3	-3.0	-3.5	-3.2	-2.5	-2.3	-2.7	-2.7	-2.6	-2.2	-2.0	-2.7	-3.3	-3.9	-3.7	-3.4
-3.1	-3.7	-3.1	-3.2	-4.2	-7.5	-8.1	-6.8	-5.9	-5.3	-4.3	-4.0	-3.8	-3.8	-4.0	-4.2	-5.0	-6.5	-6.6	-6.6	-5.0	-5.5	-6.0	-6.3	-6.9	-4.9	-3.7	-4.1	-4.4	-3.5	-3.3	-4.2	-4.7	-4.2	-4.1	-2.5
-4.8	-4.0	-4.3	-4.3	-6.4	-9.7	-8.1	-7.9	-7.6	-6.1	-3.8	-3.8	-4.5	-6.5	-7.3	-7.8	-10.3	-8.3	-8.4	-12.0	-15.3	-17.1	-17.1	-13.9	-15.7	-9.5	-7.1	-6.0	-7.1	-6.4	-6.9	-6.5	-5.1	-5.5	-5.5	-4.2
-6.0	-6.0	-8.3	-9.0	-10.0	-10.2	-8.0	-6.0	-4.6	-3.5	-4.8	-5.3	-7.1	-10.1	-11.1	-10.1	-10.1	-10.5	-11.3	-13.8	-16.2	-14.5	-11.7	-11.4	-12.6	-8.9	-6.9	-7.4	-9.2	-8.3	-7.4	-6.0	-5.5	-5.6	-4.9	-5.2
-6.0	-7.9	-9.5	-9.7	-9.1	-8.1	-6.0	-3.5	-4.2	-4.2	-6.1	-6.7	-8.1	-8.5	-7.3	-5.6	-6.5	-5.6	-5.9	-5.5	-4.8	-3.7	-4.1	-5.6	-5.7	-2.4	-3.0	-5.0	-6.0	-5.2	-5.3	-5.0	-5.2	-5.0	-5.7	-6.4
-4.8	-6.5	-7.5	-7.5	-7.5	-6.9	-6.2	-5.9	-5.6	-5.2	-4.2	-4.0	-4.7	-4.9	-5.2	-5.6	-5.7	-4.9	-3.0	-2.1	-1.9	-3.7	-5.9	-4.7	-2.6	-3.1	-2.7	-3.5	-3.4	-3.0	-2.4	-2.9	-3.1	-3.1	-3.5	-3.9
-7.7	-10.8	-13.2	-14.3	-14.9	-14.3	-13.7	-13.1	-12.1	-10.0	-6.2	-7.4	-10.6	-12.0	-12.0	-12.4	-12.5	-11.3	-9.6	-9.0	-9.8	-10.6	-8.0	-3.6	-2.6	-4.2	-5.6	-7.4	-8.0	-6.3	-5.0	-4.2	-3.9	-3.1	-4.1	-5.9
-9.2	-9.2	-11.6	-12.0	-13.4	-14.2	-14.9	-15.8	-15.5	-15.0	-11.4	-9.7	-13.5	-15.1	-14.8	-15.1	-14.8	-14.9	-15.0	-13.7	-14.2	-13.8	-12.8	-9.4	-9.2	-11.0	-11.9	-12.2	-13.1	-13.0	-12.5	-12.8	-13.1	-12.2	-10.1	-9.2
-7.4	-6.3	-7.0	-7.4	-6.7	-6.9	-7.5	-8.7	-9.4	-10.2	-10.2	-7.9	-7.9	-7.7	-8.7	-9.7	-9.5	-10.3	-11.7	-12.5	-11.8	-12.9	-12.7	-11.9	-11.9	-11.9	-12.8	-13.1	-12.0	-11.6	-11.6	-12.2	-12.0	-11.3	-9.7	-8.7
-3.0	-2.7	-2.5	-3.0	-4.4	-3.1	-2.0	-2.2	-2.9	-2.9	-3.2	-4.0	-4.0	-3.0	-3.0	-2.3	-2.4	-3.9	-4.3	-5.9	-6.3	-6.4	-5.7	-5.4	-6.4	-6.0	-5.9	-5.9	-5.4	-5.2	-4.7	-5.2	-4.6	-4.2	-3.3	-3.3
-1.3	-.4	-.4	-1.2	-1.2	-1.1	-1.0	-1.1	-.7	-.8	-.1	-.9	-.7	-.3	-.3	.3	.6	.4	1.4	1.1	.3	.6	.8	.4	.4	.4	.2	-.1	-.2	.1	-.4	-.9	-.9	-1.3	-.7	-.5
1.4	2.0	2.3	1.7	2.1	2.4	2.4	2.2	2.1	1.9	2.3	2.4	2.0	2.2	2.7	3.1	3.1	3.3	3.8	3.8	3.6	3.6	3.6	3.4	3.4	3.4	3.5	3.5	2.9	2.7	2.4	2.0	1.8	1.4	1.1	1.6
5.4	5.6	5.8	5.7	5.0	4.9	4.6	4.4	4.4	4.6	4.7	5.6	5.6	5.3	5.6	6.2	6.7	7.1	7.2	7.2	7.0	7.0	7.7	9.2	8.7	7.3	8.8	10.0	9.5	8.1	8.0	8.8	7.2	6.0	5.8	5.8
9.4	9.0	8.8	9.1	10.0	10.2	9.6	10.0	10.7	9.8	9.1	10.6	10.0	9.6	9.9	11.3	14.4	17.9	19.8	21.2	20.7	22.7	25.5	29.7	22.8	22.1	26.5	28.5	29.6	27.5	29.2	29.5	26.6	22.6	18.3	9.9
13.2	12.9	12.5	13.2	13.5	14.4	16.4	19.2	20.3	19.3	17.6	16.6	17.6	19.0	20.6	23.0	25.1	27.3	29.0	29.9	31.3	32.7	32.5	32.9	33.6	33.8	33.5	33.6	34.2	34.7	33.0	29.8	26.4	22.0	15.9	13.7

Figure 31. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA15, using all observations



2.6	2.4	2.3	2.7	2.9	2.7	2.9	3.1	3.2	3.3	3.3	3.3	3.2	2.9	2.8	2.9	3.0	2.8	2.7	2.6	2.6	2.4	2.4	2.3	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.6	2.7	2.7	2.6	2.6
3.0	2.9	2.8	2.8	2.8	2.8	2.7	2.9	2.9	3.4	3.4	3.3	2.9	2.3	2.3	2.9	3.0	2.9	2.8	2.7	2.7	2.9	2.8	2.8	2.7	2.6	2.6	2.5	2.5	2.7	2.7	2.8	3.2	3.1	3.1	3.1
3.2	3.5	3.4	3.5	3.2	3.1	3.1	3.2	3.1	3.0	2.8	3.0	3.1	2.8	3.1	3.2	3.1	3.1	3.1	3.4	3.2	3.4	3.2	3.2	3.2	3.1	3.2	3.4	3.6	3.6	3.7	3.5	3.5	3.4	3.4	3.1
3.1	3.5	3.7	3.4	3.3	3.9	3.6	3.4	3.3	3.4	3.1	3.2	3.6	3.9	3.5	3.4	3.5	3.5	3.6	2.3	3.6	3.5	3.3	2.8	3.1	3.6	4.0	3.8	3.2	3.0	3.0	3.5	3.7	3.4	3.5	3.3
3.7	3.7	3.5	3.3	3.9	4.4	4.7	3.9	3.8	4.4	4.4	4.0	3.7	3.5	3.5	3.7	3.9	4.1	4.2	4.0	4.4	4.7	4.7	4.3	4.3	3.8	3.5	3.6	3.7	3.5	3.5	3.8	3.8	3.6	3.9	3.9
3.8	3.5	3.9	3.8	4.0	5.0	5.8	4.5	4.3	4.7	4.0	3.4	3.4	3.7	3.7	3.6	4.4	4.8	4.5	4.6	4.1	3.9	4.3	4.4	4.7	4.3	3.3	3.4	3.7	3.3	3.6	3.5	4.2	4.4	4.5	4.5
4.0	4.0	4.1	4.0	3.4	3.7	3.7	3.5	3.2	3.0	2.8	3.7	4.0	4.1	3.8	4.1	4.3	4.5	4.0	3.6	3.6	5.2	4.6	4.1	4.7	3.1	2.1	2.8	3.3	3.0	2.9	2.9	2.8	3.1	3.5	4.0
3.9	3.9	4.4	3.9	4.4	4.4	4.1	2.7	2.8	3.0	3.7	3.9	3.7	3.5	3.4	3.3	3.5	3.6	3.7	3.7	3.9	2.7	2.5	2.7	2.8	1.7	1.9	2.6	3.0	3.1	2.9	2.7	2.8	3.0	3.2	3.4
3.4	4.0	4.0	4.0	4.1	4.1	3.9	3.7	4.0	3.8	2.7	2.9	3.0	3.0	3.7	3.8	3.9	3.8	2.9	2.6	2.5	3.0	2.7	2.6	2.3	2.1	2.0	2.1	2.1	1.9	1.9	2.2	2.2	2.3	2.5	2.6
3.8	3.9	3.2	3.1	3.0	3.1	2.9	3.0	3.4	3.6	3.2	3.6	3.9	3.5	3.2	3.4	3.3	3.5	4.3	4.8	4.8	3.5	3.4	3.2	2.6	3.1	3.7	4.2	4.0	4.1	3.8	3.5	3.6	2.8	2.8	3.1
5.4	4.7	4.7	4.4	4.1	3.8	3.5	2.6	2.7	3.0	4.6	4.3	3.6	2.9	2.8	2.6	2.5	2.7	3.1	3.3	2.6	3.0	3.8	5.5	5.2	4.6	3.8	3.5	3.4	4.5	5.2	5.1	5.4	4.9	5.1	5.0
5.3	5.2	5.3	4.9	4.9	5.2	5.4	4.8	4.2	4.2	5.0	4.7	4.5	4.9	4.7	4.2	4.4	5.1	4.5	3.7	4.0	4.2	3.8	4.0	4.7	3.8	3.6	3.9	4.4	4.6	5.2	5.6	4.9	4.9	5.1	4.7
4.4	4.2	4.3	5.0	5.1	4.5	4.2	4.3	4.8	4.4	4.5	4.4	4.6	4.3	4.7	4.2	4.0	4.4	4.7	4.9	4.6	4.8	4.8	4.8	5.2	4.6	4.4	4.5	4.6	4.9	4.7	4.6	4.3	4.4	4.5	4.5
3.5	3.8	3.8	3.9	3.9	3.9	3.7	3.7	3.9	4.4	4.2	3.8	3.9	3.7	3.5	3.5	3.5	3.3	3.2	3.4	3.6	3.7	3.8	3.8	3.6	3.5	3.6	3.8	3.6	3.6	3.8	3.8	4.0	3.8	3.9	3.8
3.5	3.2	3.2	3.2	3.1	3.1	3.1	3.1	3.2	3.1	2.9	3.3	3.5	3.4	3.2	3.3	3.2	3.3	3.2	3.0	2.9	3.1	3.2	2.9	2.8	2.7	2.8	2.9	2.9	2.9	3.1	3.5	3.5	3.2	3.4	3.6
3.5	3.0	2.9	2.9	3.1	3.2	2.9	3.0	2.9	2.8	2.8	3.4	3.3	3.1	3.1	3.4	3.2	3.1	3.1	2.9	2.9	2.9	4.6	5.9	4.9	3.3	5.5	6.9	6.7	5.4	5.7	6.3	4.7	3.6	3.1	3.5
2.2	2.3	2.5	3.0	3.9	4.3	4.0	4.5	4.3	4.4	3.4	2.6	2.4	2.7	2.8	4.1	5.7	6.6	7.5	7.7	8.6	7.9	7.1	5.7	6.6	6.3	5.1	4.8	5.5	6.5	7.4	5.2	5.3	4.8	4.5	2.3
5.6	5.4	5.2	5.1	5.2	5.0	4.8	4.7	5.4	4.7	4.8	5.0	5.6	5.7	5.2	4.3	3.8	3.5	3.7	3.9	4.1	4.6	4.9	4.4	3.9	3.7	3.6	3.3	4.3	5.3	5.0	4.5	4.6	5.1	6.4	6.0

Figure 32. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations



-11.0	-11.0	-11.0	-10.9	-10.8	-10.7	-10.6	-10.5	-10.4	-10.4	-10.3	-10.3	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.2	-10.3	-10.3	-10.4	-10.5	-10.6	-10.7	-10.9	-11.0	-11.1	-11.1	-11.1	-11.1	-11.1	-11.0	-11.0	-11.0	-11.0
-10.3	-10.4	-10.5	-10.4	-10.3	-10.1	-10.0	-9.9	-9.8	-9.8	-9.8	-9.7	-9.5	-9.3	-9.4	-9.6	-9.8	-9.9	-9.8	-9.7	-9.6	-9.5	-9.6	-9.7	-9.9	-10.2	-10.3	-10.4	-10.4	-10.3	-10.1	-10.0	-9.9	-9.9	-10.0	-10.1
-8.4	-8.6	-8.5	-8.3	-8.2	-8.2	-8.3	-8.2	-8.2	-8.3	-8.4	-8.4	-8.5	-8.5	-8.7	-8.9	-8.9	-8.8	-8.4	-8.2	-8.1	-8.0	-8.0	-8.2	-8.5	-8.7	-8.7	-8.7	-8.6	-8.6	-8.4	-8.2	-8.1	-8.1	-8.1	-8.8
-7.2	-7.1	-7.2	-7.2	-7.1	-7.0	-7.1	-7.1	-7.1	-7.3	-7.3	-7.4	-7.3	-7.4	-7.7	-7.8	-7.5	-7.5	-7.2	-7.2	-7.3	-7.0	-7.2	-7.2	-7.3	-7.6	-7.5	-7.4	-7.5	-7.6	-7.5	-7.3	-6.9	-7.0	-7.0	-7.1
-6.2	-5.8	-5.8	-6.2	-6.1	-6.1	-6.2	-6.2	-6.1	-6.3	-6.3	-6.3	-6.1	-6.0	-6.0	-6.0	-6.0	-6.2	-5.9	-6.2	-6.3	-6.7	-7.0	-7.1	-7.1	-6.8	-6.6	-6.6	-6.7	-6.6	-6.7	-6.6	-6.2	-6.3	-6.5	-5.9
-4.9	-4.7	-4.6	-4.8	-4.9	-5.4	-5.5	-5.6	-5.5	-5.3	-5.3	-5.1	-4.9	-4.8	-5.0	-4.9	-5.2	-5.2	-5.2	-5.9	-6.4	-7.5	-7.9	-7.7	-7.8	-7.5	-7.0	-6.5	-6.8	-6.6	-6.7	-6.4	-5.8	-5.6	-5.5	-4.7
-4.1	-4.2	-4.4	-4.5	-4.7	-5.0	-5.0	-5.0	-4.7	-4.4	-4.5	-4.1	-4.3	-4.5	-4.6	-4.7	-5.0	-4.8	-5.4	-6.0	-6.2	-7.0	-7.0	-7.3	-7.4	-7.4	-6.5	-6.2	-6.6	-6.0	-6.0	-5.6	-5.3	-4.9	-4.7	-4.3
-4.3	-4.5	-4.7	-4.7	-4.7	-4.9	-4.7	-4.6	-4.5	-4.2	-4.4	-4.1	-4.4	-4.4	-4.4	-4.5	-4.7	-4.1	-4.8	-4.8	-4.7	-5.0	-5.1	-5.2	-5.4	-4.5	-5.1	-5.5	-5.4	-5.0	-5.2	-4.9	-5.1	-4.6	-4.6	-4.6
-4.4	-4.6	-4.7	-4.5	-4.5	-4.5	-4.4	-4.4	-4.4	-4.2	-4.3	-3.9	-4.1	-4.2	-4.0	-4.2	-4.3	-3.8	-4.2	-3.9	-4.0	-4.1	-4.3	-4.3	-4.4	-4.4	-4.4	-4.6	-4.5	-4.5	-4.5	-4.5	-4.6	-4.5	-4.5	-4.7
-4.3	-4.8	-4.9	-4.7	-4.7	-4.6	-4.6	-4.5	-4.5	-4.3	-4.2	-4.1	-4.2	-4.3	-4.1	-4.2	-4.3	-4.0	-4.4	-4.0	-4.2	-4.3	-4.2	-4.0	-4.2	-4.4	-4.4	-4.6	-4.5	-4.6	-4.5	-4.5	-4.6	-4.4	-4.6	-4.9
-4.1	-4.4	-4.4	-4.1	-4.1	-4.0	-4.0	-4.1	-4.0	-3.9	-3.8	-3.8	-3.8	-3.9	-3.8	-3.9	-3.9	-4.0	-4.2	-3.8	-4.2	-4.2	-4.3	-4.2	-4.5	-4.7	-4.7	-4.8	-4.5	-4.7	-4.6	-4.6	-4.7	-4.6	-4.4	-4.6
-2.9	-3.0	-3.1	-2.8	-2.7	-2.6	-2.5	-2.5	-2.4	-2.6	-2.5	-2.6	-2.3	-2.4	-2.3	-2.4	-2.4	-2.8	-2.6	-2.9	-3.0	-2.9	-3.1	-3.2	-3.6	-3.8	-3.9	-3.7	-3.3	-3.5	-3.4	-3.2	-3.1	-3.3	-3.1	-3.4
-1.3	-1.2	-1.3	-1.0	-.8	-.8	-.8	-.7	-.6	-.5	-.3	-.6	-.5	-.4	-.4	-.4	-.3	-.7	-.4	-.7	-.8	-.6	-.7	-.8	-1.1	-1.3	-1.4	-1.5	-1.3	-1.5	-1.4	-1.4	-1.2	-1.1	-1.1	-1.3
.6	.9	.9	.9	1.2	1.4	1.5	1.7	1.8	1.8	2.1	2.0	2.0	2.2	2.1	2.3	2.5	2.2	2.7	2.5	2.4	2.4	2.4	2.1	2.0	1.7	1.3	1.0	.6	.5	.5	.5	.6	.6	.6	.9
4.1	4.4	4.7	4.5	4.9	5.1	5.3	5.3	5.4	5.5	5.6	5.9	5.9	6.1	6.3	6.7	6.9	7.1	7.5	7.5	7.5	7.7	7.9	7.6	7.2	6.8	6.3	5.9	5.0	4.7	4.4	4.2	4.1	3.9	4.0	4.3
9.5	9.5	9.9	10.0	10.0	10.0	10.2	10.2	10.2	10.2	10.4	10.6	11.0	11.3	11.7	11.9	12.2	12.6	12.6	12.8	12.9	13.0	13.2	13.3	13.2	12.7	12.8	12.6	11.8	11.1	10.6	10.3	9.7	9.3	9.5	9.6
13.8	13.7	13.8	14.0	14.2	14.2	14.2	14.4	14.5	14.3	14.3	14.8	14.8	14.9	15.3	15.6	16.1	16.6	17.0	17.4	17.5	17.7	17.9	18.6	17.7	17.6	17.8	17.6	17.6	17.2	17.4	17.2	16.3	15.6	14.7	14.1
16.5	16.7	16.7	16.7	16.7	16.9	17.2	17.5	18.2	17.9	17.8	17.7	17.9	18.1	18.2	18.4	18.6	19.0	19.6	19.7	20.1	20.6	21.0	21.5	21.4	21.0	20.7	20.6	20.3	20.2	19.8	19.0	18.4	17.7	17.1	16.7

Figure 33. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA15, using all observations

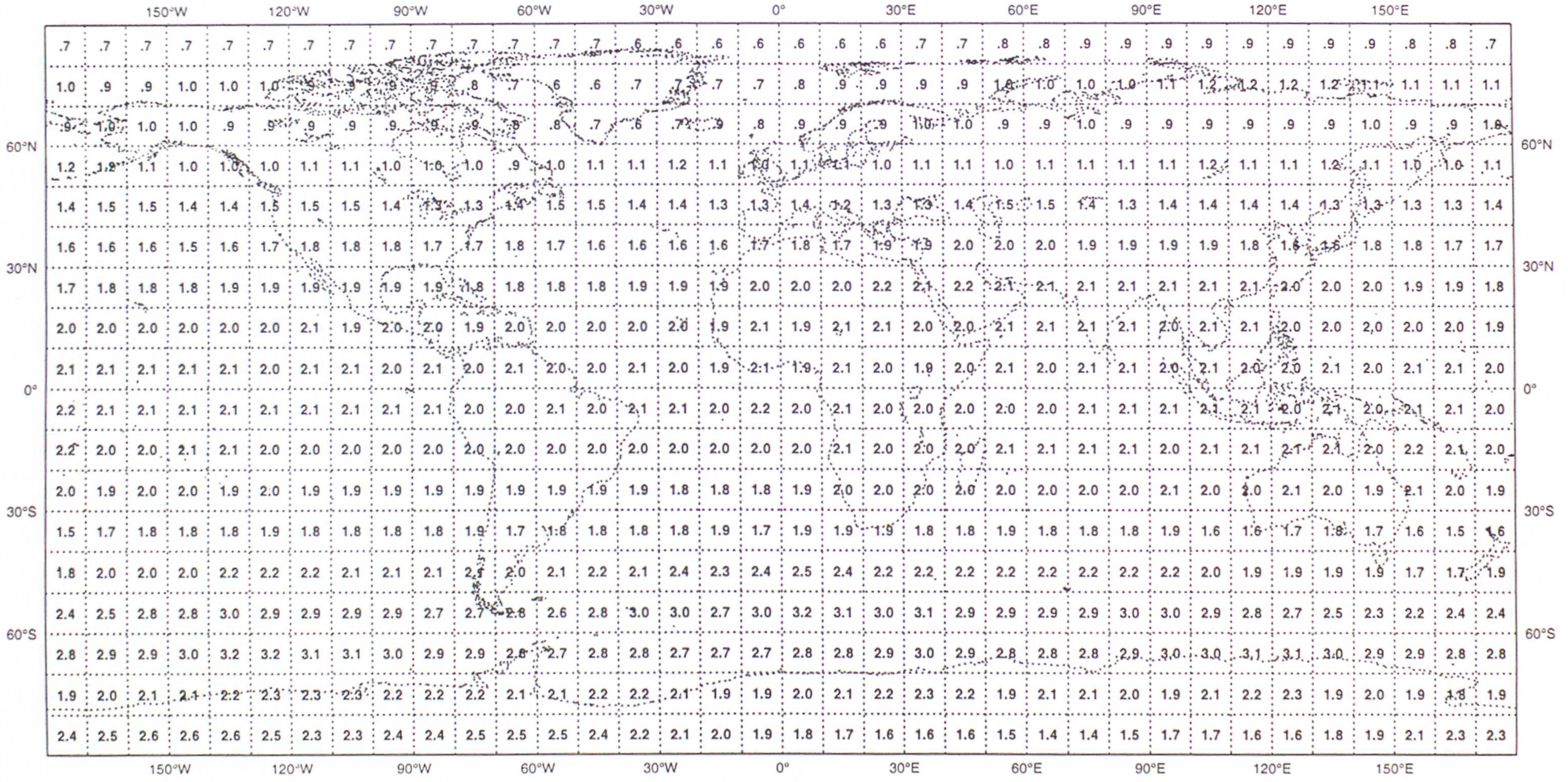
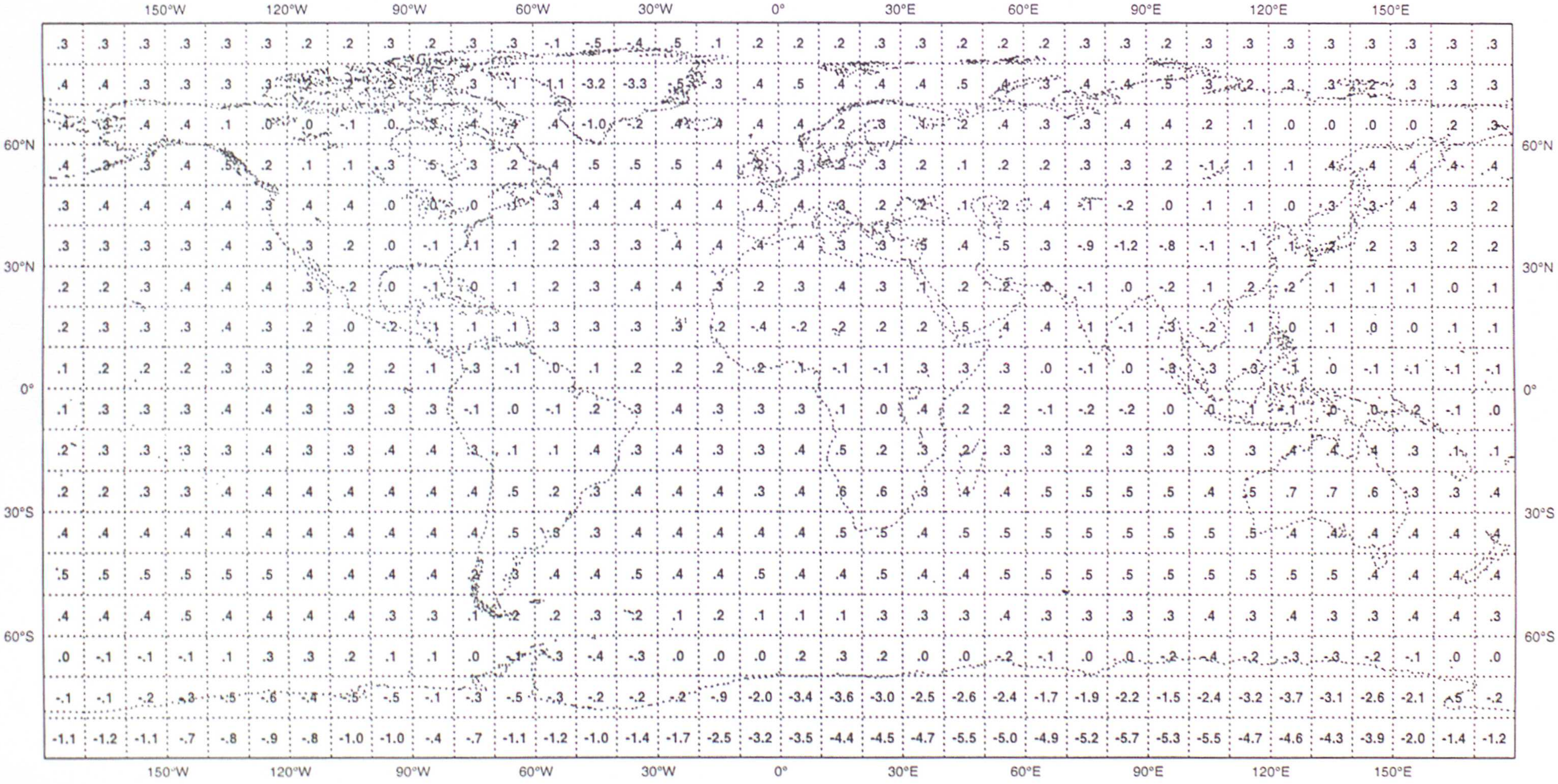

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .7 .6 .6 .6 .6 .6 .6 .6 .7 .7 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .7
1.0 .9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .8 .7 .6 .6 .7 .7 .7 .7 .8 .9 .9 .9 .9 1.0 1.0 1.0 1.0 1.1 1.2 1.2 1.2 1.2 1.1 1.1 1.1 1.1
.9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 .8 .8 .7 .6 .7 .9 .8 .9 .9 .9 1.0 1.0 .9 .9 1.0 .9 .9 .9 .9 .9 .9 1.0 .9 .9 1.0
1.2 1.2 1.1 1.0 1.0 1.0 1.1 1.1 1.0 1.0 1.0 .9 1.0 1.1 1.1 1.2 1.1 1.0 1.1 1.1 1.0 1.1 1.1 1.0 1.1 1.1 1.1 1.1 1.2 1.1 1.1 1.2 1.1 1.0 1.0 1.1
1.4 1.5 1.5 1.4 1.4 1.5 1.5 1.5 1.4 1.3 1.3 1.4 1.5 1.5 1.4 1.4 1.3 1.3 1.4 1.2 1.3 1.3 1.4 1.5 1.5 1.4 1.3 1.4 1.4 1.4 1.4 1.3 1.3 1.3 1.3 1.4
1.6 1.6 1.6 1.5 1.6 1.7 1.8 1.8 1.8 1.7 1.7 1.8 1.7 1.6 1.6 1.6 1.6 1.7 1.8 1.7 1.9 1.9 2.0 2.0 2.0 1.9 1.9 1.9 1.9 1.8 1.6 1.6 1.8 1.8 1.7 1.7
1.7 1.8 1.8 1.8 1.9 1.9 1.9 1.9 1.9 1.9 1.8 1.8 1.8 1.8 1.9 1.9 1.9 2.0 2.0 2.0 2.2 2.1 2.2 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.0 2.0 1.9 1.9 1.8
2.0 2.0 2.0 2.0 2.0 2.0 2.1 1.9 2.0 2.0 1.9 2.0 2.0 2.0 2.0 2.0 1.9 2.1 1.9 2.1 2.1 2.0 2.0 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.0 2.0 2.0 2.0 2.0 1.9
2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.0 2.1 2.0 2.1 2.0 2.0 2.1 2.0 1.9 2.1 1.9 2.1 2.0 1.9 2.0 2.1 2.0 2.1 2.1 2.0 2.1 2.0 2.0 2.1 2.0 2.1 2.1 2.0
2.2 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.1 2.0 2.0 2.1 2.0 2.1 2.1 2.0 2.2 2.0 2.1 2.0 2.0 2.0 2.0 2.0 2.1 2.1 2.1 2.1 2.1 2.0 2.1 2.0 2.1 2.1 2.0
2.2 2.0 2.0 2.1 2.1 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.1 2.0 2.0 2.0 2.1 2.1 2.1 2.1 2.0 2.1 2.1 2.1 2.1 2.0 2.2 2.1 2.0
2.0 1.9 2.0 2.0 1.9 2.0 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.9 1.8 1.8 1.8 1.9 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.1 2.0 2.0 2.1 2.0 1.9 2.1 2.0 1.9
1.5 1.7 1.8 1.8 1.8 1.9 1.8 1.8 1.8 1.8 1.9 1.7 1.8 1.8 1.8 1.8 1.9 1.7 1.9 1.9 1.9 1.8 1.8 1.9 1.8 1.8 1.8 1.9 1.6 1.6 1.7 1.8 1.7 1.6 1.5 1.6
1.8 2.0 2.0 2.0 2.2 2.2 2.2 2.1 2.1 2.1 2.1 2.0 2.1 2.2 2.1 2.4 2.3 2.4 2.5 2.4 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.2 2.0 1.9 1.9 1.9 1.9 1.7 1.7 1.9
2.4 2.5 2.8 2.8 3.0 2.9 2.9 2.9 2.9 2.7 2.7 2.8 2.6 2.8 3.0 3.0 2.7 3.0 3.2 3.1 3.0 3.1 2.9 2.9 2.9 2.9 3.0 3.0 2.9 2.8 2.7 2.5 2.3 2.2 2.4 2.4
2.8 2.9 2.9 3.0 3.2 3.2 3.1 3.1 3.0 2.9 2.9 2.8 2.7 2.8 2.8 2.7 2.7 2.7 2.8 2.8 2.9 3.0 2.9 2.8 2.8 2.8 2.9 3.0 3.0 3.1 3.1 3.0 2.9 2.9 2.8 2.8
1.9 2.0 2.1 2.1 2.2 2.3 2.3 2.3 2.2 2.2 2.2 2.1 2.1 2.2 2.2 2.1 1.9 1.9 2.0 2.1 2.2 2.3 2.2 1.9 2.1 2.1 2.0 1.9 2.1 2.2 2.3 1.9 2.0 1.9 1.8 1.9
2.4 2.5 2.6 2.6 2.6 2.5 2.3 2.3 2.4 2.4 2.5 2.5 2.5 2.4 2.2 2.1 2.0 1.9 1.8 1.7 1.6 1.6 1.6 1.5 1.4 1.4 1.5 1.7 1.7 1.6 1.6 1.8 1.9 2.1 2.3 2.3

Figure 34. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations



.3	.3	.3	.3	.3	.3	.2	.2	.3	.2	.3	.3	-.1	-.5	-.4	.5	.1	.2	.2	.2	.3	.3	.2	.2	.2	.3	.3	.2	.3	.3	.3	.3	.3	.3	.3	.3
.4	.4	.3	.3	.3	.3	.2	.2	.2	.1	.3	.1	-1.1	-3.2	-3.3	-.5	.3	.4	.5	.4	.4	.4	.5	.4	.3	.4	.4	.5	.3	.2	.3	.3	.2	.3	.3	.3
.4	.3	.4	.4	.1	.0	.0	-.1	.0	.3	.4	.4	.4	-1.0	-.2	.4	.4	.4	.4	.2	.3	.1	.2	.4	.3	.3	.4	.4	.2	.1	.0	.0	.0	.0	.2	.3
.4	.3	.3	.4	.5	.2	.1	.1	.3	.5	.3	.2	.4	.5	.5	.5	.4	.2	.3	.2	.3	.2	.1	.2	.2	.3	.3	.2	-.1	.1	.1	.4	.4	.4	.4	.4
.3	.4	.4	.4	.4	.3	.4	.4	.0	.0	.0	.1	.3	.4	.4	.4	.4	.4	.4	.3	.2	.2	.1	.2	.4	-.1	-.2	.0	.1	.1	.0	.3	.3	.4	.3	.2
.3	.3	.3	.3	.4	.3	.3	.2	.0	-.1	.1	.1	.2	.3	.3	.4	.4	.4	.4	.3	.3	.5	.4	.5	.3	-.9	-1.2	-.8	-.1	-.1	.1	.2	.2	.3	.2	.2
.2	.2	.3	.4	.4	.4	.3	-.2	.0	-.1	.0	.1	.2	.3	.4	.4	.3	.2	.3	.4	.3	.1	.2	.2	.0	-.1	.0	-.2	.1	.2	.2	.1	.1	.1	.0	.1
.2	.3	.3	.3	.4	.3	.2	.0	-.2	-.1	.1	.1	.3	.3	.3	.3	.2	-.4	-.2	.2	.2	.2	.5	.4	.4	-.1	-.1	-.3	-.2	.1	.0	.1	.0	.0	.1	.1
.1	.2	.2	.2	.3	.3	.2	.2	.2	.1	-.3	-.1	.0	.1	.2	.2	.2	.2	.1	-.1	-.1	.3	.3	.3	.0	-.1	.0	-.3	-.3	-.3	-.1	.0	-.1	-.1	-.1	-.1
.1	.3	.3	.3	.4	.4	.3	.3	.3	.3	-.1	.0	-.1	.2	.3	.4	.3	.3	.3	.1	.0	.4	.2	.2	-.1	-.2	-.2	.0	.0	.1	-.1	.0	.0	-.2	-.1	.0
.2	.3	.3	.3	.3	.4	.3	.3	.4	.4	.3	.1	.1	.4	.3	.4	.3	.3	.4	.5	.2	.3	.2	.3	.3	.2	.3	.3	.3	.3	.4	.4	.4	.3	.1	.1
.2	.2	.3	.3	.4	.4	.4	.4	.4	.4	.4	.5	.2	.3	.4	.4	.4	.3	.4	.6	.6	.3	.4	.4	.5	.5	.5	.5	.4	.5	.7	.7	.6	.3	.3	.4
.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5	.8	.3	.4	.4	.4	.4	.4	.5	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.4	.4
.5	.5	.5	.5	.5	.5	.4	.4	.4	.4	.2	.3	.4	.4	.5	.4	.4	.5	.4	.4	.5	.4	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4	.4	.4	.4
.4	.4	.4	.5	.4	.4	.4	.4	.3	.3	.1	.2	.2	.3	.2	.1	.2	.1	.1	.1	.3	.3	.3	.4	.3	.3	.3	.3	.4	.3	.4	.3	.3	.4	.4	.3
.0	-.1	-.1	-.1	.1	.3	.3	.2	.1	.1	.0	-.1	-.3	-.4	-.3	.0	.0	.0	.2	.3	.2	.0	.0	-.2	-.1	.0	.0	-.2	-.4	-.2	-.3	-.3	-.2	-.1	.0	.0
-.1	-.1	-.2	-.3	-.5	-.6	-.4	-.5	-.5	-.1	-.3	-.5	-.3	-.2	-.2	-.2	-.9	-2.0	-3.4	-3.6	-3.0	-2.5	-2.6	-2.4	-1.7	-1.9	-2.2	-1.5	-2.4	-3.2	-3.7	-3.1	-2.6	-2.1	-.5	-.2
-1.1	-1.2	-1.1	-.7	-.8	-.9	-.8	-1.0	-1.0	-.4	-.7	-1.1	-1.2	-1.0	-1.4	-1.7	-2.5	-3.2	-3.5	-4.4	-4.5	-4.7	-5.5	-5.0	-4.9	-5.2	-5.7	-5.3	-5.5	-4.7	-4.6	-4.3	-3.9	-2.0	-1.4	-1.2

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

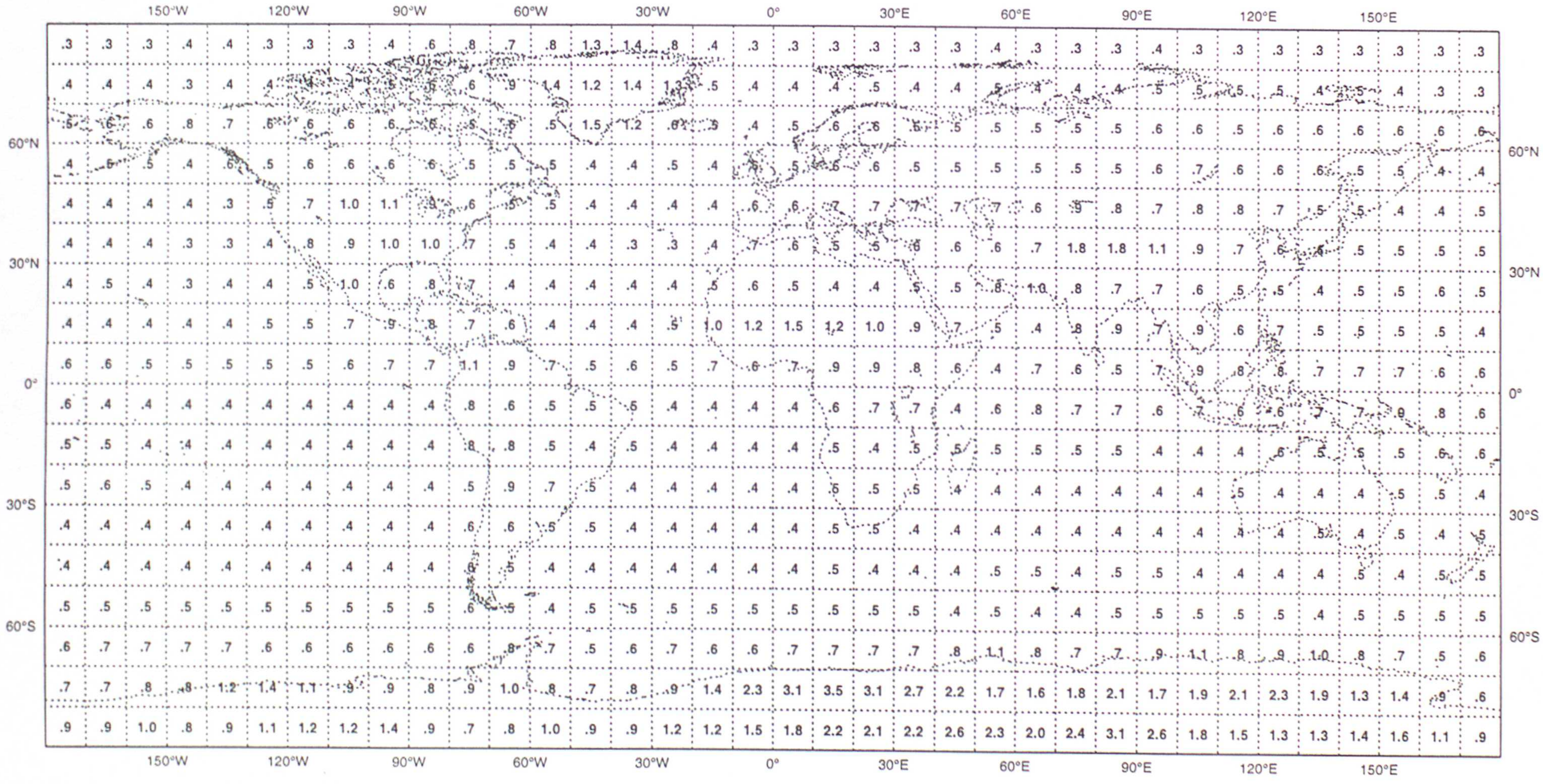

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 35. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA15, using all observations

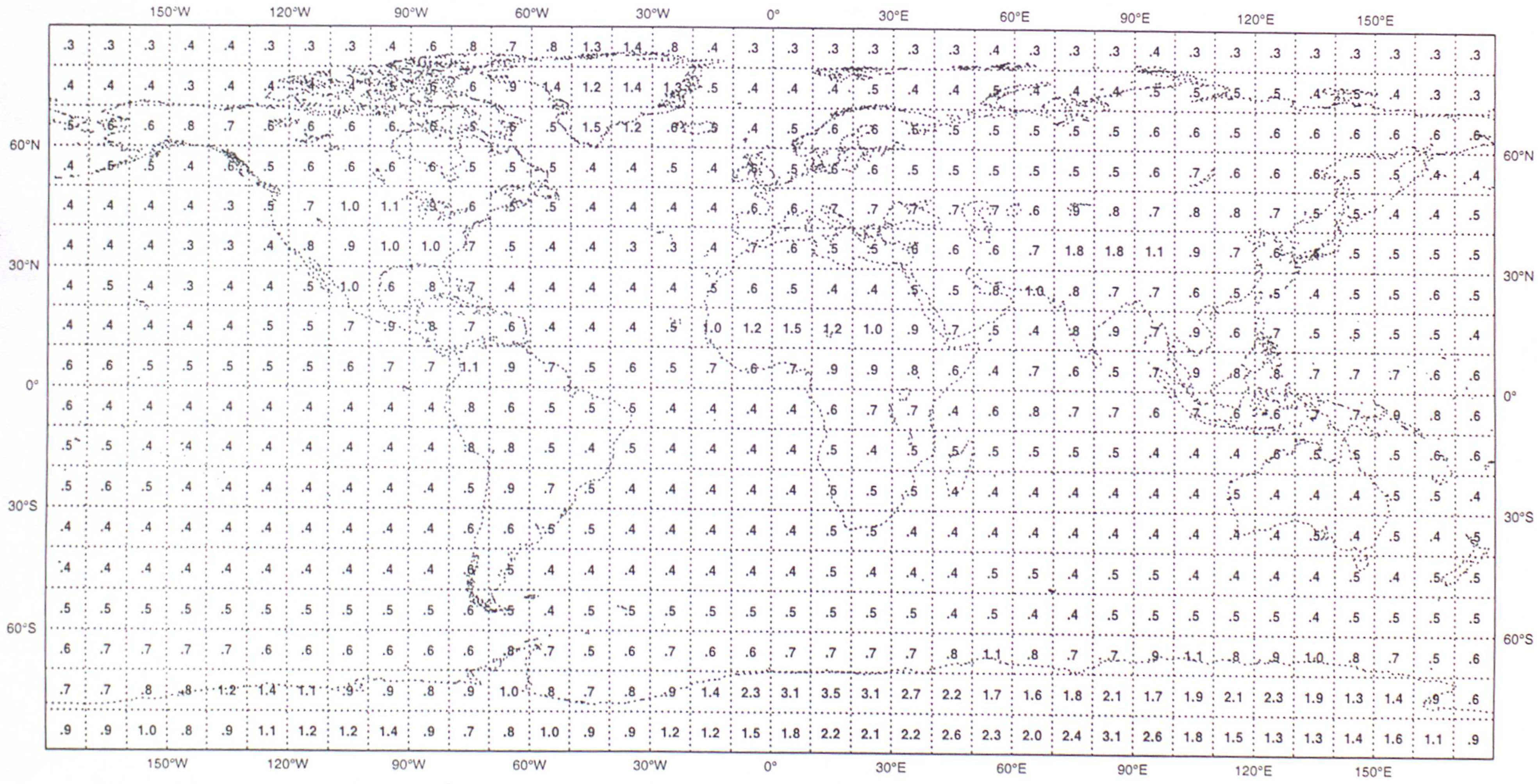

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 36. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

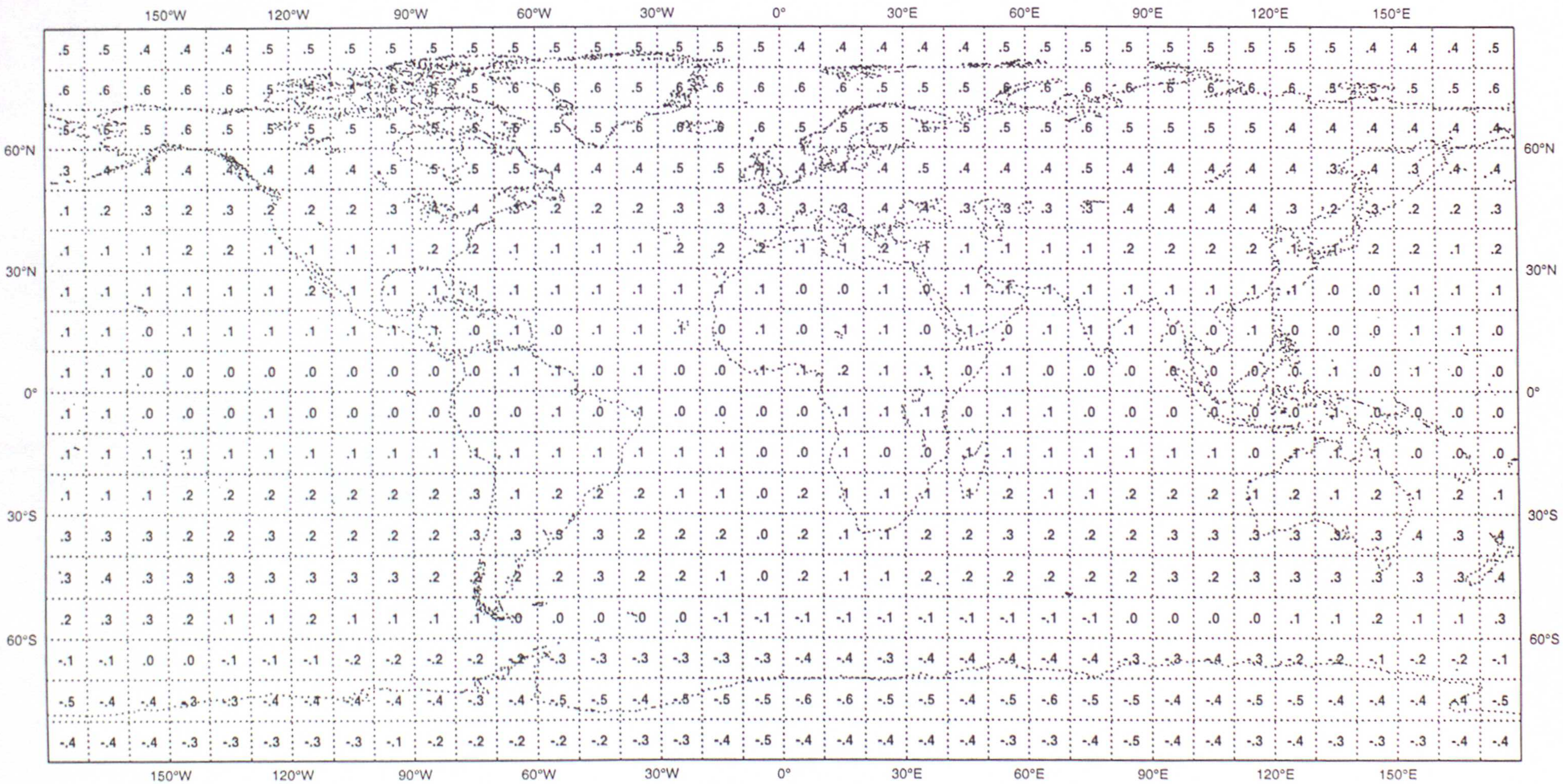

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.5 .5 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .5
.6 .6 .6 .6 .6 .5 .5 .5 .6 .5 .5 .6 .6 .6 .5 .6 .6 .6 .6 .6 .5 .5 .5 .6 .6 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .6
.5 .6 .5 .6 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .5 .6 .5 .5 .5 .5 .4 .4 .4 .4 .4 .4
.3 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .4 .4 .4 .5 .4 .4 .4 .4 .4 .3 .4 .3 .4 .4
.1 .2 .3 .2 .3 .2 .2 .2 .3 .4 .4 .3 .2 .2 .2 .3 .3 .3 .3 .3 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .3 .2 .3 .2 .2 .3
.1 .1 .1 .2 .2 .1 .1 .1 .1 .2 .2 .1 .1 .1 .1 .2 .2 .2 .1 .1 .2 .1 .1 .1 .1 .1 .2 .2 .2 .2 .1 .1 .2 .2 .1 .2
.1 .1 .1 .1 .1 .1 .2 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .0 .0 .1 .0 .1 .1 .1 .1 .1 .1 .1 .1 .1 .0 .0 .1 .1 .1
.1 .1 .0 .1 .1 .1 .1 .1 .1 .1 .0 .1 .0 .1 .1 .1 .0 .1 .0 .1 .1 .0 .1 .0 .1 .1 .1 .0 .0 .1 .0 .0 .0 .1 .1 .0
.1 .1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .0 .1 .0 .0 .1 .1 .2 .1 .1 .0 .1 .0 .0 .0 .0 .0 .0 .0 .1 .0 .1 .0 .0
.1 .1 .0 .0 .0 .1 .0 .0 .0 .0 .0 .0 .1 .0 .1 .0 .0 .0 .0 .1 .1 .1 .0 .1 .1 .0 .0 .0 .0 .0 .0 .1 .0 .0 .0 .0
.1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .1 .0 .0 .1 .0 .0 .1 .1 .1 .1 .1 .1 .1 .0 .1 .1 .1 .0 .0 .0
.1 .1 .1 .2 .2 .2 .2 .2 .2 .2 .3 .1 .2 .2 .2 .1 .1 .0 .2 .1 .1 .1 .1 .2 .1 .1 .2 .2 .2 .1 .2 .1 .2 .1 .2 .1
.3 .3 .3 .2 .2 .3 .2 .2 .2 .2 .3 .3 .3 .3 .2 .2 .2 .0 .2 .1 .1 .2 .2 .3 .2 .2 .2 .3 .3 .3 .3 .3 .3 .4 .3 .4
.3 .4 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .3 .2 .2 .1 .0 .2 .1 .1 .2 .2 .2 .2 .2 .2 .3 .2 .3 .3 .3 .3 .3 .3 .4
.2 .3 .3 .2 .1 .1 .2 .1 .1 .1 .1 .0 .0 .0 .0 .0 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .1 .1 .2 .1 .1 .3
-.1 -.1 .0 .0 -.1 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.4 -.4 -.3 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.4 -.3 -.2 -.2 -.1 -.2 -.2 -.1
-.5 -.4 -.4 -.3 -.3 -.4 -.4 -.4 -.4 -.4 -.3 -.4 -.5 -.5 -.4 -.5 -.5 -.5 -.6 -.6 -.5 -.5 -.4 -.5 -.6 -.5 -.5 -.4 -.4 -.5 -.5 -.4 -.4 -.4 -.4 -.5
-.4 -.4 -.4 -.3 -.3 -.3 -.3 -.3 -.1 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.5 -.4 -.4 -.4 -.4 -.4 -.4 -.3 -.3 -.4 -.5 -.4 -.4 -.3 -.4 -.3 -.3 -.3 -.4 -.4

Figure 37. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA15, using all observations

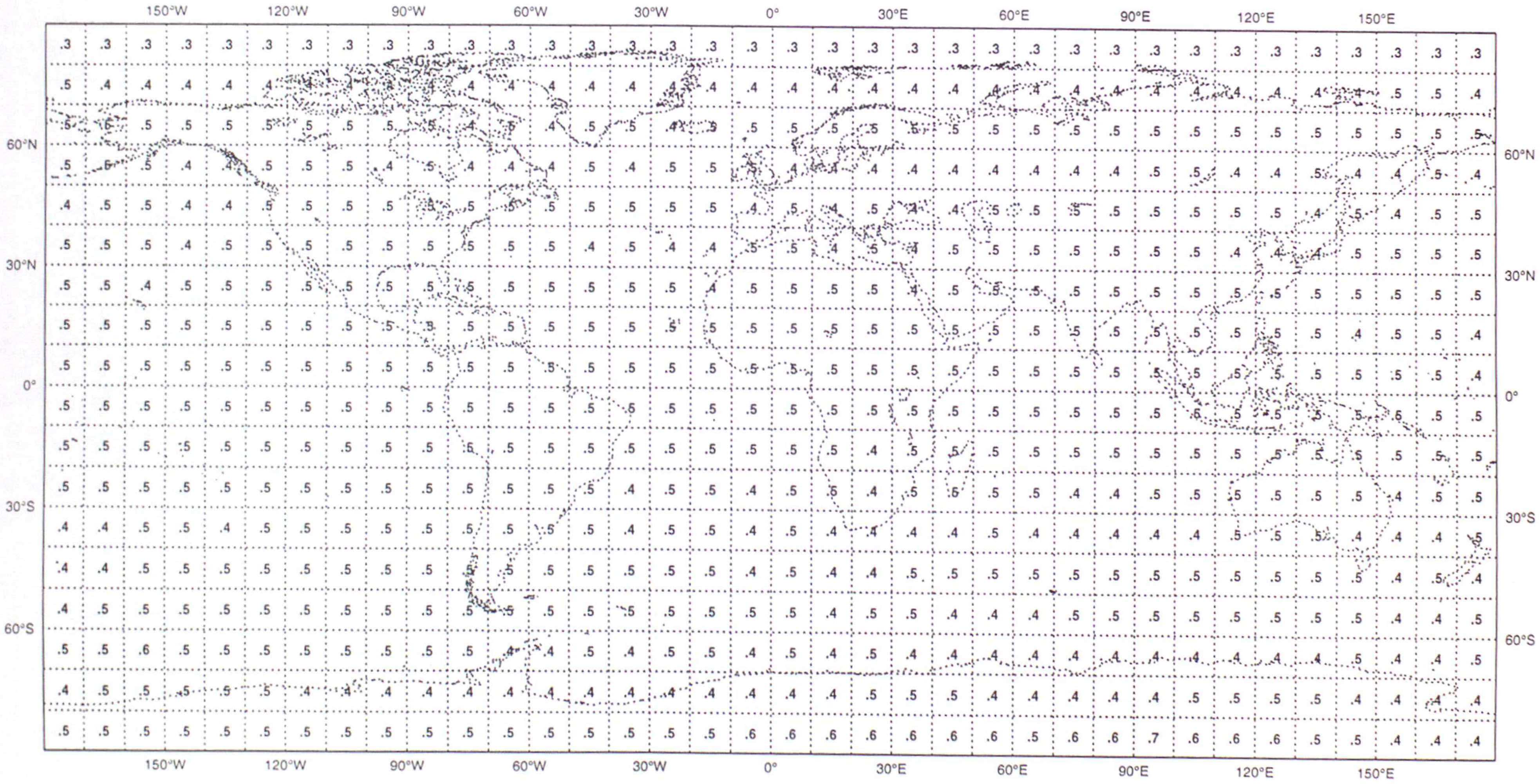

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 38. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

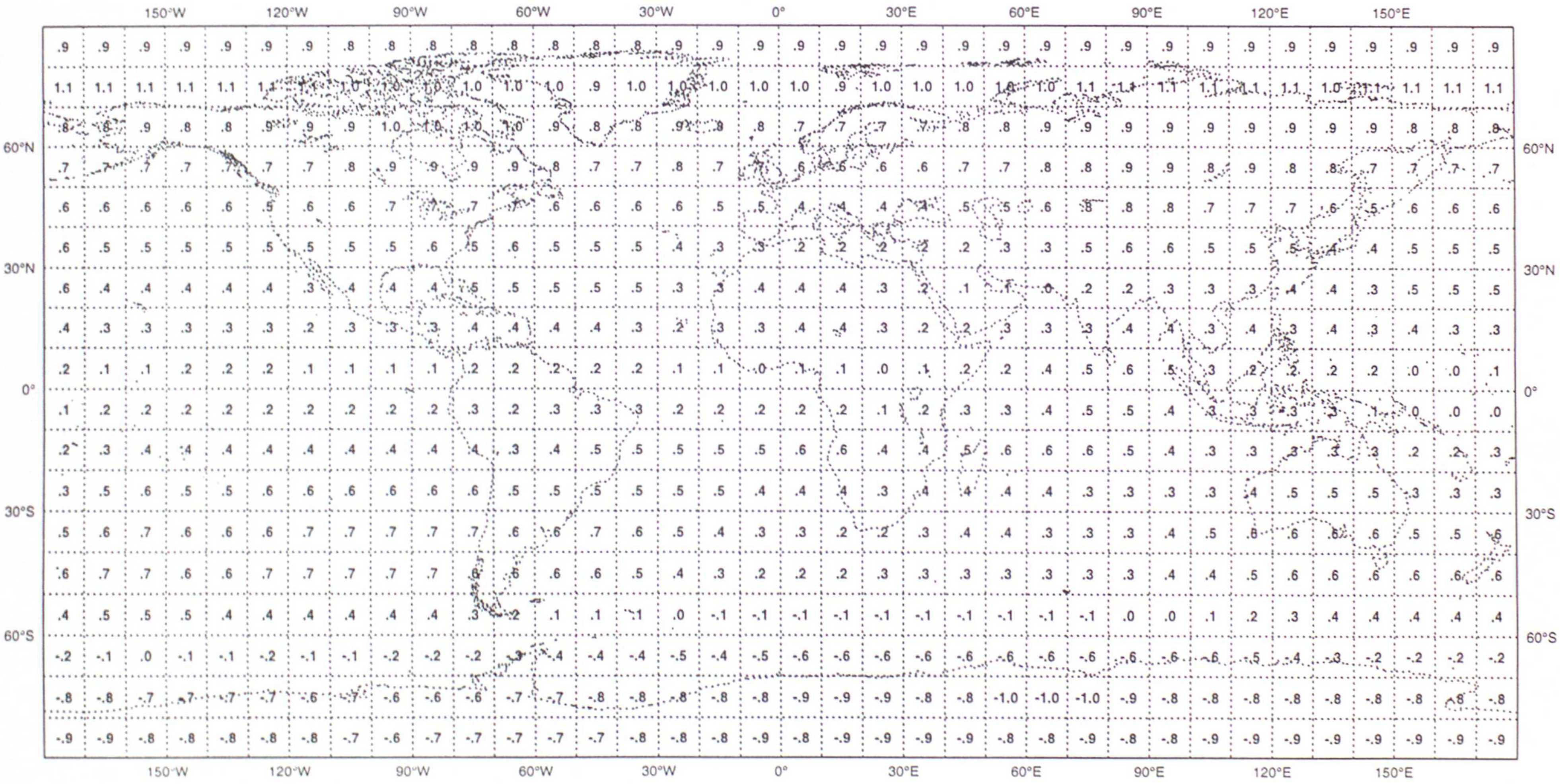

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9
1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 .9 1.0 1.0 1.0 1.0 .9 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.1 1.1 1.1 1.1
.8 .8 .9 .8 .8 .9 .9 .9 1.0 1.0 1.0 1.0 .9 .8 .8 .9 .8 .8 .7 .7 .7 .7 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9 .8 .8 .8
.7 .7 .7 .7 .7 .7 .7 .8 .9 .9 .9 .9 .8 .7 .7 .8 .7 .7 .6 .6 .6 .6 .7 .7 .8 .8 .9 .9 .8 .9 .8 .8 .7 .7 .7 .7
.6 .6 .6 .6 .6 .5 .6 .6 .7 .7 .7 .7 .6 .6 .6 .6 .5 .5 .4 .4 .4 .4 .5 .5 .6 .8 .8 .8 .7 .7 .7 .6 .5 .6 .6 .6
.6 .5 .5 .5 .5 .5 .5 .5 .5 .6 .5 .6 .5 .5 .5 .4 .3 .3 .2 .2 .2 .2 .2 .3 .3 .5 .6 .6 .5 .5 .5 .4 .4 .5 .5 .5
.6 .4 .4 .4 .4 .4 .3 .4 .4 .4 .5 .5 .5 .5 .5 .3 .3 .4 .4 .4 .3 .2 .1 .1 .0 .2 .2 .3 .3 .3 .4 .4 .3 .5 .5 .5
.4 .3 .3 .3 .3 .3 .2 .3 .3 .3 .4 .4 .4 .4 .3 .2 .3 .3 .4 .4 .3 .2 .2 .3 .3 .3 .4 .4 .3 .4 .3 .4 .3 .4 .3 .3
.2 .1 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .2 .2 .2 .1 .1 .0 .1 .1 .0 .1 .2 .2 .4 .5 .6 .5 .3 .2 .2 .2 .2 .0 .0 .1
.1 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .2 .3 .3 .3 .2 .2 .2 .2 .2 .1 .2 .3 .3 .4 .5 .5 .4 .3 .3 .3 .3 .1 .0 .0 .0
.2 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .5 .5 .5 .5 .5 .6 .6 .4 .4 .5 .6 .6 .6 .5 .4 .3 .3 .3 .3 .3 .2 .2 .3
.3 .5 .6 .5 .5 .6 .6 .6 .6 .6 .6 .5 .5 .5 .5 .5 .5 .4 .4 .4 .3 .4 .4 .4 .4 .3 .3 .3 .3 .4 .5 .5 .5 .3 .3 .3
.5 .6 .7 .6 .6 .6 .7 .7 .7 .7 .7 .6 .6 .7 .6 .5 .4 .3 .3 .2 .2 .3 .4 .4 .3 .3 .3 .4 .5 .6 .6 .6 .6 .5 .5 .6
.6 .7 .7 .6 .6 .7 .7 .7 .7 .7 .6 .6 .6 .6 .5 .4 .3 .2 .2 .2 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .6 .6 .6 .6 .6 .6
.4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .3 .2 .1 .1 .1 .0 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 .0 .0 .1 .2 .3 .4 .4 .4 .4 .4
-.2 -.1 .0 -.1 -.1 -.2 -.1 -.1 -.2 -.2 -.2 -.3 -.4 -.4 -.4 -.5 -.4 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.5 -.4 -.3 -.2 -.2 -.2 -.2
-.8 -.8 -.7 -.7 -.7 -.7 -.6 -.7 -.6 -.6 -.6 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.9 -.9 -.9 -.8 -.8 -1.0 -1.0 -1.0 -.9 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.8
-.9 -.9 -.8 -.8 -.8 -.8 -.8 -.7 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.9 -.8 -.9 -.9 -.9 -.9 -.8 -.8 -.9 -.8 -.8 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.9

Figure 39. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA15, using all observations

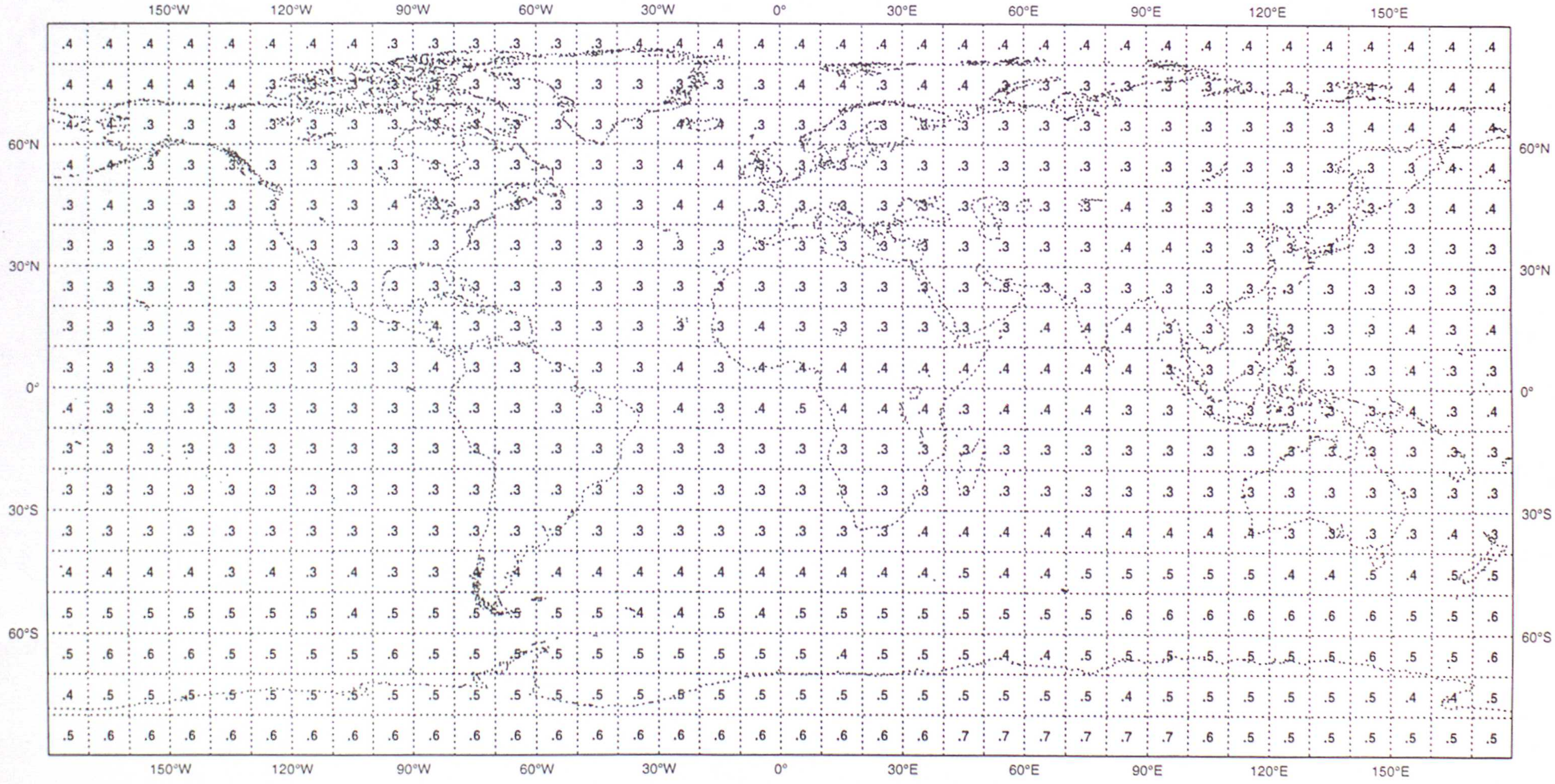
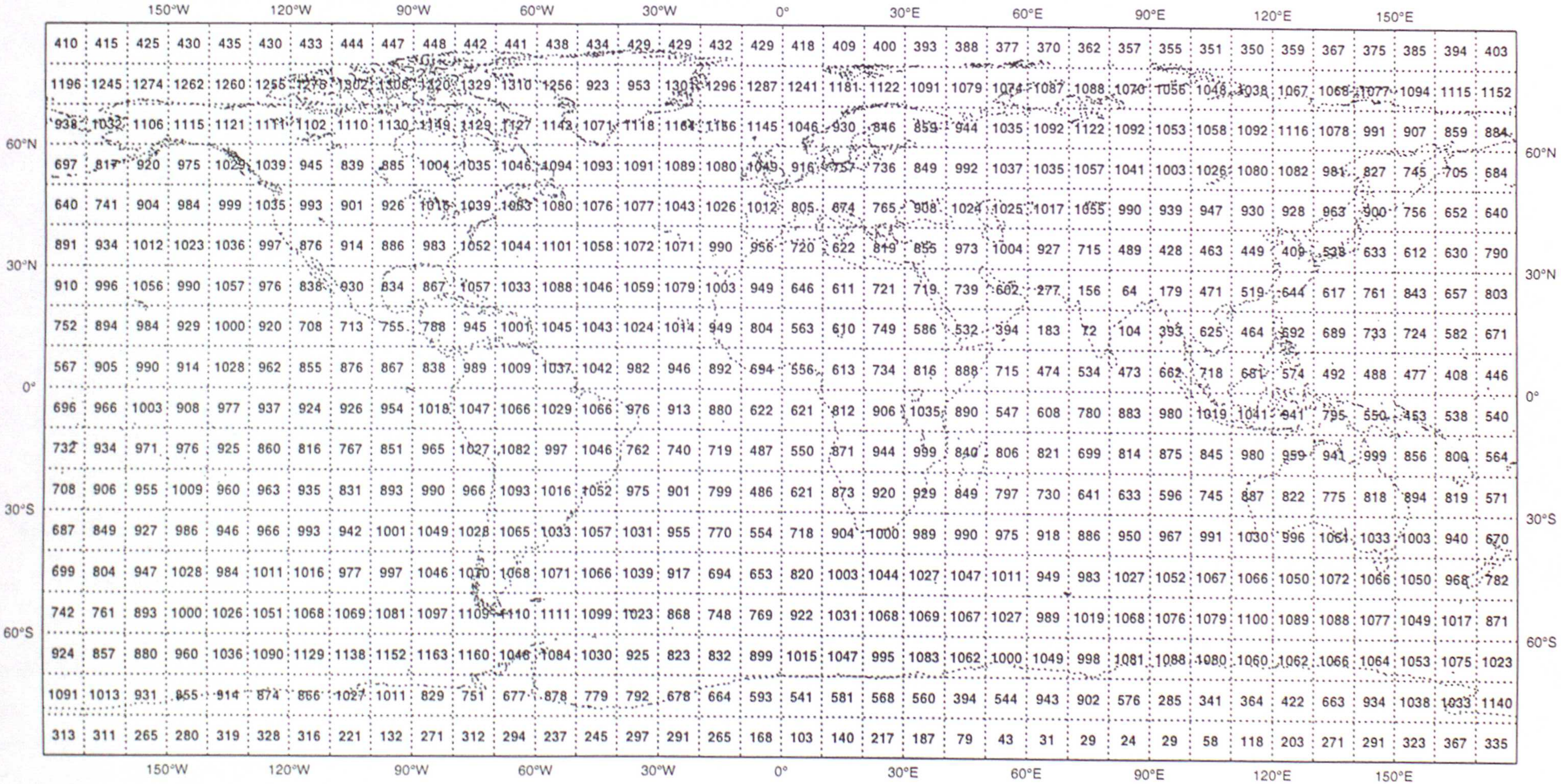
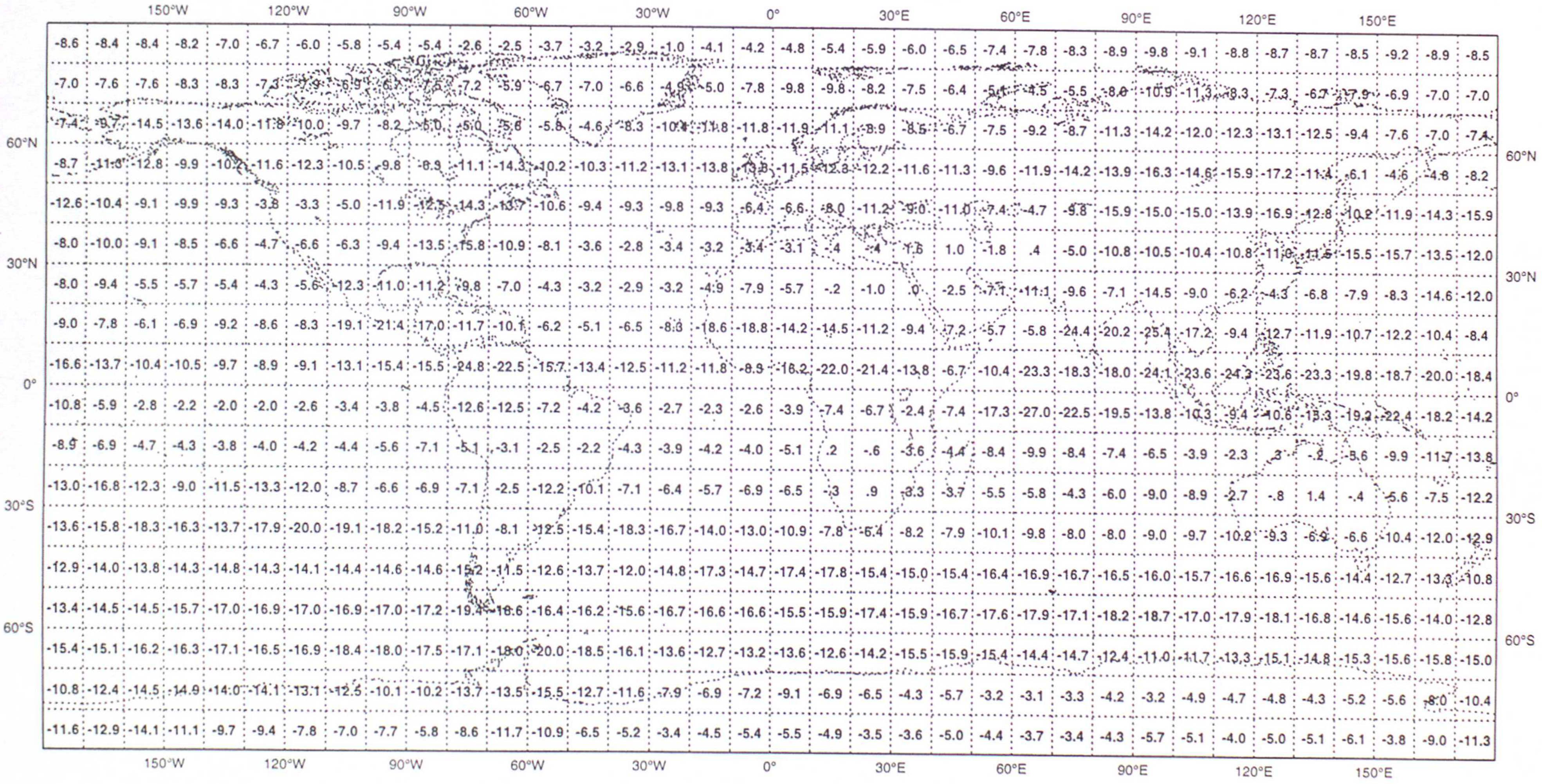

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 40. ATOVS mean daily count. JULY 2003
NOAA16, using all observations
Global average number of observations in 24 hours = 542155



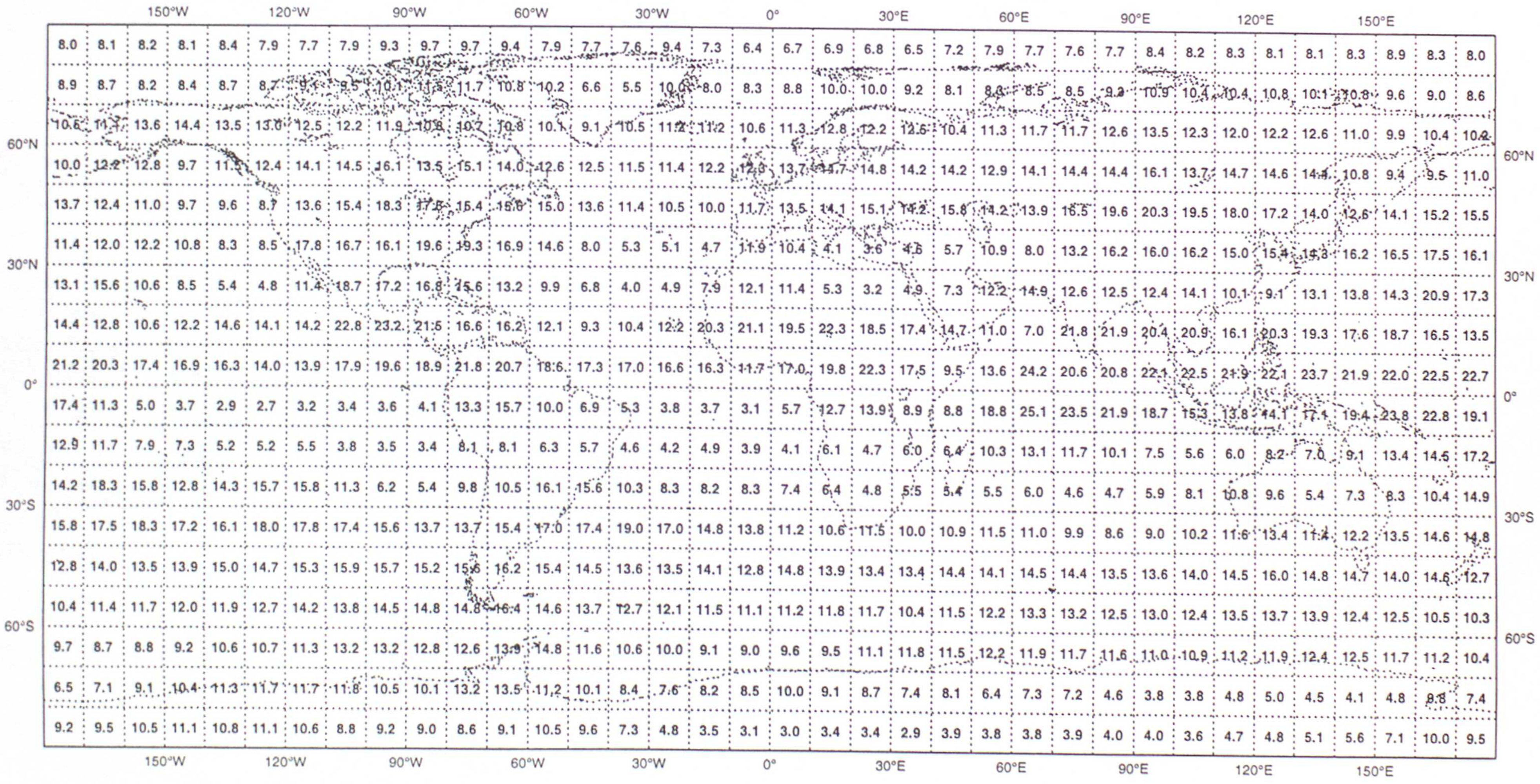
410	415	425	430	435	430	433	444	447	448	442	441	438	434	429	429	432	429	418	409	400	393	388	377	370	362	357	355	351	350	359	367	375	385	394	403
1196	1245	1274	1262	1260	1255	1276	1302	1308	1320	1329	1310	1256	923	953	1301	1296	1287	1241	1181	1122	1091	1079	1074	1087	1088	1070	1056	1048	1038	1067	1068	1077	1094	1115	1152
938	1032	1106	1115	1121	1111	1102	1110	1130	1149	1129	1127	1142	1071	1118	1164	1156	1145	1046	930	846	859	944	1035	1092	1122	1092	1053	1058	1092	1116	1078	991	907	859	884
697	817	920	975	1029	1039	945	839	885	1004	1035	1046	1094	1093	1091	1089	1080	1049	916	757	736	849	992	1037	1035	1057	1041	1003	1026	1080	1082	981	827	745	705	684
640	741	904	984	999	1035	993	901	926	1016	1039	1063	1080	1076	1077	1043	1026	1012	805	674	765	908	1024	1025	1017	1055	990	939	947	930	928	963	900	756	652	640
891	934	1012	1023	1036	997	876	914	886	983	1052	1044	1101	1058	1072	1071	990	956	720	622	819	855	973	1004	927	715	489	428	463	449	409	538	633	612	630	790
910	996	1056	990	1057	976	838	930	834	867	1057	1033	1088	1046	1059	1079	1003	949	646	611	721	719	739	602	277	156	64	179	471	519	644	617	761	843	657	803
752	894	984	929	1000	920	708	713	755	788	945	1001	1045	1043	1024	1014	949	804	563	610	749	586	532	394	183	72	104	393	625	464	592	689	733	724	582	671
567	905	990	914	1028	962	855	876	867	838	989	1009	1037	1042	982	946	892	694	556	613	734	816	888	715	474	534	473	662	718	681	574	492	488	477	408	446
696	966	1003	908	977	937	924	926	954	1018	1047	1066	1029	1066	976	913	880	622	621	812	906	1035	890	547	608	780	883	980	1019	1041	941	795	550	453	538	540
732	934	971	976	925	860	816	767	851	965	1027	1082	997	1046	762	740	719	487	550	871	944	999	840	806	821	699	814	875	845	980	959	941	999	856	800	564
708	906	955	1009	960	963	935	831	893	990	966	1093	1016	1052	975	901	799	486	621	873	920	929	849	797	730	641	633	596	745	887	822	775	818	894	819	571
687	849	927	986	946	966	993	942	1001	1049	1028	1065	1033	1057	1031	955	770	554	718	904	1000	989	990	975	918	886	950	967	991	1030	996	1061	1033	1003	940	670
699	804	947	1028	984	1011	1016	977	997	1046	1070	1068	1071	1066	1039	917	694	653	820	1003	1044	1027	1047	1011	949	983	1027	1052	1067	1066	1050	1072	1066	1050	968	782
742	761	893	1000	1026	1051	1068	1069	1081	1097	1109	1110	1111	1099	1023	868	748	769	922	1031	1068	1069	1067	1027	989	1019	1068	1076	1079	1100	1089	1088	1077	1049	1017	871
924	857	880	960	1036	1090	1129	1138	1152	1163	1160	1046	1084	1030	925	823	832	899	1015	1047	995	1083	1062	1000	1049	998	1081	1088	1080	1060	1062	1066	1064	1053	1075	1023
1091	1013	931	855	914	874	866	1027	1011	829	751	677	878	779	792	678	664	593	541	581	568	560	394	544	943	902	576	285	341	364	422	663	934	1038	1033	1140
313	311	265	280	319	328	316	221	132	271	312	294	237	245	297	291	265	168	103	140	217	187	79	43	31	29	24	29	58	118	203	271	291	323	367	335

Figure 41. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



-8.6	-8.4	-8.4	-8.2	-7.0	-6.7	-6.0	-5.8	-5.4	-5.4	-2.6	-2.5	-3.7	-3.2	-2.9	-1.0	-4.1	-4.2	-4.8	-5.4	-5.9	-6.0	-6.5	-7.4	-7.8	-8.3	-8.9	-9.8	-9.1	-8.8	-8.7	-8.7	-8.5	-9.2	-8.9	-8.5
-7.0	-7.6	-7.6	-8.3	-8.3	-7.3	-7.9	-6.9	-6.7	-7.5	-7.2	-5.9	-6.7	-7.0	-6.6	-4.9	-5.0	-7.8	-9.8	-9.8	-8.2	-7.5	-6.4	-5.1	-4.5	-5.5	-8.0	-10.9	-11.3	-8.3	-7.3	-6.7	-7.9	-6.9	-7.0	-7.0
-7.4	-9.7	-14.5	-13.6	-14.0	-11.8	-10.0	-9.7	-8.2	-5.0	-5.0	-5.6	-5.8	-4.6	-8.3	-10.4	-11.8	-11.8	-11.9	-11.1	-8.9	-8.5	-6.7	-7.5	-9.2	-8.7	-11.3	-14.2	-12.0	-12.3	-13.1	-12.5	-9.4	-7.6	-7.0	-7.4
-8.7	-11.3	-12.8	-9.9	-10.2	-11.6	-12.3	-10.5	-9.8	-8.9	-11.1	-14.3	-10.2	-10.3	-11.2	-13.1	-13.8	-13.8	-11.5	-12.3	-12.2	-11.6	-11.3	-9.6	-11.9	-14.2	-13.9	-16.3	-14.6	-15.9	-17.2	-11.4	-6.1	-4.6	-4.8	-8.2
-12.6	-10.4	-9.1	-9.9	-9.3	-3.8	-3.3	-5.0	-11.9	-12.5	-14.3	-13.7	-10.6	-9.4	-9.3	-9.8	-9.3	-6.4	-6.6	-8.0	-11.2	-9.0	-11.0	-7.4	-4.7	-9.8	-15.9	-15.0	-15.0	-13.9	-16.9	-12.8	-10.2	-11.9	-14.3	-15.9
-8.0	-10.0	-9.1	-8.5	-6.6	-4.7	-6.6	-6.3	-9.4	-13.5	-15.8	-10.9	-8.1	-3.6	-2.8	-3.4	-3.2	-3.4	-3.1	-.4	-.4	1.6	1.0	-1.8	.4	-5.0	-10.8	-10.5	-10.4	-10.8	-11.0	-11.5	-15.5	-15.7	-13.5	-12.0
-8.0	-9.4	-5.5	-5.7	-5.4	-4.3	-5.6	-12.3	-11.0	-11.2	-9.8	-7.0	-4.3	-3.2	-2.9	-3.2	-4.9	-7.9	-5.7	-.2	-1.0	.0	-2.5	-7.1	-11.1	-9.6	-7.1	-14.5	-9.0	-6.2	-4.3	-6.8	-7.9	-8.3	-14.6	-12.0
-9.0	-7.8	-6.1	-6.9	-9.2	-8.6	-8.3	-19.1	-21.4	-17.0	-11.7	-10.1	-6.2	-5.1	-6.5	-8.3	-18.6	-18.8	-14.2	-14.5	-11.2	-9.4	-7.2	-5.7	-5.8	-24.4	-20.2	-25.4	-17.2	-9.4	-12.7	-11.9	-10.7	-12.2	-10.4	-8.4
-16.6	-13.7	-10.4	-10.5	-9.7	-8.9	-9.1	-13.1	-15.4	-15.5	-24.8	-22.5	-15.7	-13.4	-12.5	-11.2	-11.8	-8.9	-16.2	-22.0	-21.4	-13.8	-6.7	-10.4	-23.3	-18.3	-18.0	-24.1	-23.6	-24.3	-23.6	-23.3	-19.8	-18.7	-20.0	-18.4
-10.8	-5.9	-2.8	-2.2	-2.0	-2.0	-2.6	-3.4	-3.8	-4.5	-12.6	-12.5	-7.2	-4.2	-3.6	-2.7	-2.3	-2.6	-3.9	-7.4	-6.7	-2.4	-7.4	-17.3	-27.0	-22.5	-19.5	-13.8	-10.3	-9.4	-10.6	-13.3	-19.2	-22.4	-18.2	-14.2
-8.9	-6.9	-4.7	-4.3	-3.8	-4.0	-4.2	-4.4	-5.6	-7.1	-5.1	-3.1	-2.5	-2.2	-4.3	-3.9	-4.2	-4.0	-5.1	.2	-.6	-3.6	-4.4	-8.4	-9.9	-8.4	-7.4	-6.5	-3.9	-2.3	.3	-.2	-5.6	-9.9	-11.7	-13.8
-13.0	-16.8	-12.3	-9.0	-11.5	-13.3	-12.0	-8.7	-6.6	-6.9	-7.1	-2.5	-12.2	-10.1	-7.1	-6.4	-5.7	-6.9	-6.5	-.3	.9	-3.3	-3.7	-5.5	-5.8	-4.3	-6.0	-9.0	-8.9	-2.7	-.8	1.4	-.4	-5.6	-7.5	-12.2
-13.6	-15.8	-18.3	-16.3	-13.7	-17.9	-20.0	-19.1	-18.2	-15.2	-11.0	-8.1	-12.5	-15.4	-18.3	-16.7	-14.0	-13.0	-10.9	-7.8	-6.4	-8.2	-7.9	-10.1	-9.8	-8.0	-8.0	-9.0	-9.7	-10.2	-9.3	-6.9	-6.6	-10.4	-12.0	-12.9
-12.9	-14.0	-13.8	-14.3	-14.8	-14.3	-14.1	-14.4	-14.6	-14.6	-15.2	-11.5	-12.6	-13.7	-12.0	-14.8	-17.3	-14.7	-17.4	-17.8	-15.4	-15.0	-15.4	-16.4	-16.9	-16.7	-16.5	-16.0	-15.7	-16.6	-16.9	-15.6	-14.4	-12.7	-13.3	-10.8
-13.4	-14.5	-14.5	-15.7	-17.0	-16.9	-17.0	-16.9	-17.0	-17.2	-19.4	-18.6	-16.4	-16.2	-15.6	-16.7	-16.6	-16.6	-15.5	-15.9	-17.4	-15.9	-16.7	-17.6	-17.9	-17.1	-18.2	-18.7	-17.0	-17.9	-18.1	-16.8	-14.6	-15.6	-14.0	-12.8
-15.4	-15.1	-16.2	-16.3	-17.1	-16.5	-16.9	-18.4	-18.0	-17.5	-17.1	-18.0	-20.0	-18.5	-16.1	-13.6	-12.7	-13.2	-13.6	-12.6	-14.2	-15.5	-15.9	-15.4	-14.4	-14.7	-12.4	-11.0	-11.7	-13.3	-15.1	-14.8	-15.3	-15.6	-15.8	-15.0
-10.8	-12.4	-14.5	-14.9	-14.0	-14.1	-13.1	-12.5	-10.1	-10.2	-13.7	-13.5	-15.5	-12.7	-11.6	-7.9	-6.9	-7.2	-9.1	-6.9	-6.5	-4.3	-5.7	-3.2	-3.1	-3.3	-4.2	-3.2	-4.9	-4.7	-4.8	-4.3	-5.2	-5.6	-8.0	-10.4
-11.6	-12.9	-14.1	-11.1	-9.7	-9.4	-7.8	-7.0	-7.7	-5.8	-8.6	-11.7	-10.9	-6.5	-5.2	-3.4	-4.5	-5.4	-5.5	-4.9	-3.5	-3.6	-5.0	-4.4	-3.7	-3.4	-4.3	-5.7	-5.1	-4.0	-5.0	-5.1	-6.1	-3.8	-9.0	-11.3

Figure 42. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA16, using all observations



8.0	8.1	8.2	8.1	8.4	7.9	7.7	7.9	9.3	9.7	9.7	9.4	7.9	7.7	7.6	9.4	7.3	6.4	6.7	6.9	6.8	6.5	7.2	7.9	7.7	7.6	7.7	8.4	8.2	8.3	8.1	8.1	8.3	8.9	8.3	8.0
8.9	8.7	8.2	8.4	8.7	8.7	9.1	9.5	10.1	11.5	11.7	10.8	10.2	6.6	5.5	10.0	8.0	8.3	8.8	10.0	10.0	9.2	8.1	8.3	8.5	8.5	9.3	10.9	10.4	10.4	10.8	10.1	10.8	9.6	9.0	8.6
10.6	11.7	13.6	14.4	13.5	13.0	12.5	12.2	11.9	10.8	10.7	10.8	10.1	9.1	10.5	11.2	11.2	10.6	11.3	12.8	12.2	12.6	10.4	11.3	11.7	11.7	12.6	13.5	12.3	12.0	12.2	12.6	11.0	9.9	10.4	10.2
10.0	12.2	12.8	9.7	11.5	12.4	14.1	14.5	16.1	13.5	15.1	14.0	12.6	12.5	11.5	11.4	12.2	12.3	13.7	14.7	14.8	14.2	14.2	12.9	14.1	14.4	14.4	16.1	13.7	14.7	14.6	14.4	10.8	9.4	9.5	11.0
13.7	12.4	11.0	9.7	9.6	8.7	13.6	15.4	18.3	17.5	15.4	15.6	15.0	13.6	11.4	10.5	10.0	11.7	13.5	14.1	15.1	14.2	15.8	14.2	13.9	16.5	19.6	20.3	19.5	18.0	17.2	14.0	12.6	14.1	15.2	15.5
11.4	12.0	12.2	10.8	8.3	8.5	17.8	16.7	16.1	19.6	19.3	16.9	14.6	8.0	5.3	5.1	4.7	11.9	10.4	4.1	3.6	4.6	5.7	10.9	8.0	13.2	16.2	16.0	16.2	15.0	15.4	14.3	16.2	16.5	17.5	16.1
13.1	15.6	10.6	8.5	5.4	4.8	11.4	18.7	17.2	16.8	15.6	13.2	9.9	6.8	4.0	4.9	7.9	12.1	11.4	5.3	3.2	4.9	7.3	12.2	14.9	12.6	12.5	12.4	14.1	10.1	9.1	13.1	13.8	14.3	20.9	17.3
14.4	12.8	10.6	12.2	14.6	14.1	14.2	22.8	23.2	21.5	16.6	16.2	12.1	9.3	10.4	12.2	20.3	21.1	19.5	22.3	18.5	17.4	14.7	11.0	7.0	21.8	21.9	20.4	20.9	16.1	20.3	19.3	17.6	18.7	16.5	13.5
21.2	20.3	17.4	16.9	16.3	14.0	13.9	17.9	19.6	18.9	21.8	20.7	18.6	17.3	17.0	16.6	16.3	11.7	17.0	19.8	22.3	17.5	9.5	13.6	24.2	20.6	20.8	22.1	22.5	21.9	22.1	23.7	21.9	22.0	22.5	22.7
17.4	11.3	5.0	3.7	2.9	2.7	3.2	3.4	3.6	4.1	13.3	15.7	10.0	6.9	5.3	3.8	3.7	3.1	5.7	12.7	13.9	8.9	8.8	18.8	25.1	23.5	21.9	18.7	15.3	13.8	14.1	17.1	19.4	23.8	22.8	19.1
12.9	11.7	7.9	7.3	5.2	5.2	5.5	3.8	3.5	3.4	8.1	8.1	6.3	5.7	4.6	4.2	4.9	3.9	4.1	6.1	4.7	6.0	6.4	10.3	13.1	11.7	10.1	7.5	5.6	6.0	8.2	7.0	9.1	13.4	14.5	17.2
14.2	18.3	15.8	12.8	14.3	15.7	15.8	11.3	6.2	5.4	9.8	10.5	16.1	15.6	10.3	8.3	8.2	8.3	7.4	6.4	4.8	5.5	5.4	5.5	6.0	4.6	4.7	5.9	8.1	10.8	9.6	5.4	7.3	8.3	10.4	14.9
15.8	17.5	18.3	17.2	16.1	18.0	17.8	17.4	15.6	13.7	13.7	15.4	17.0	17.4	19.0	17.0	14.8	13.8	11.2	10.6	11.5	10.0	10.9	11.5	11.0	9.9	8.6	9.0	10.2	11.6	13.4	11.4	12.2	13.5	14.6	14.8
12.8	14.0	13.5	13.9	15.0	14.7	15.3	15.9	15.7	15.2	15.6	16.2	15.4	14.5	13.6	13.5	14.1	12.8	14.8	13.9	13.4	13.4	14.4	14.1	14.5	14.4	13.5	13.6	14.0	14.5	16.0	14.8	14.7	14.0	14.6	12.7
10.4	11.4	11.7	12.0	11.9	12.7	14.2	13.8	14.5	14.8	14.8	16.4	14.6	13.7	12.7	12.1	11.5	11.1	11.2	11.8	11.7	10.4	11.5	12.2	13.3	13.2	12.5	13.0	12.4	13.5	13.7	13.9	12.4	12.5	10.5	10.3
9.7	8.7	8.8	9.2	10.6	10.7	11.3	13.2	13.2	12.8	12.6	13.9	14.8	11.6	10.6	10.0	9.1	9.0	9.6	9.5	11.1	11.8	11.5	12.2	11.9	11.7	11.6	11.0	10.9	11.2	11.9	12.4	12.5	11.7	11.2	10.4
6.5	7.1	9.1	10.4	11.3	11.7	11.7	11.8	10.5	10.1	13.2	13.5	11.2	10.1	8.4	7.6	8.2	8.5	10.0	9.1	8.7	7.4	8.1	6.4	7.3	7.2	4.6	3.8	3.8	4.8	5.0	4.5	4.1	4.8	8.8	7.4
9.2	9.5	10.5	11.1	10.8	11.1	10.6	8.8	9.2	9.0	8.6	9.1	10.5	9.6	7.3	4.8	3.5	3.1	3.0	3.4	3.4	2.9	3.9	3.8	3.8	3.9	4.0	4.0	3.6	4.7	4.8	5.1	5.6	7.1	10.0	9.5

Figure 43. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations

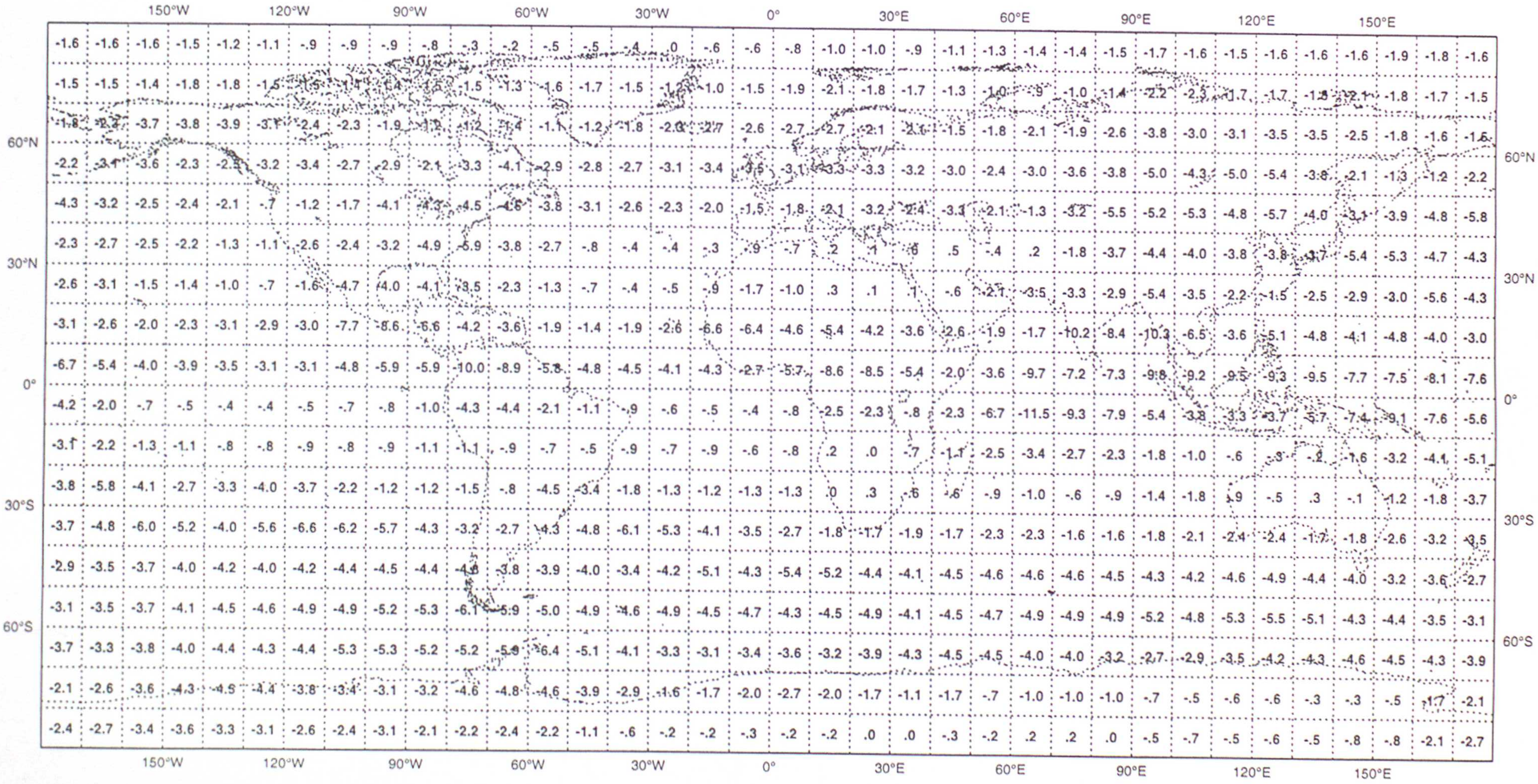
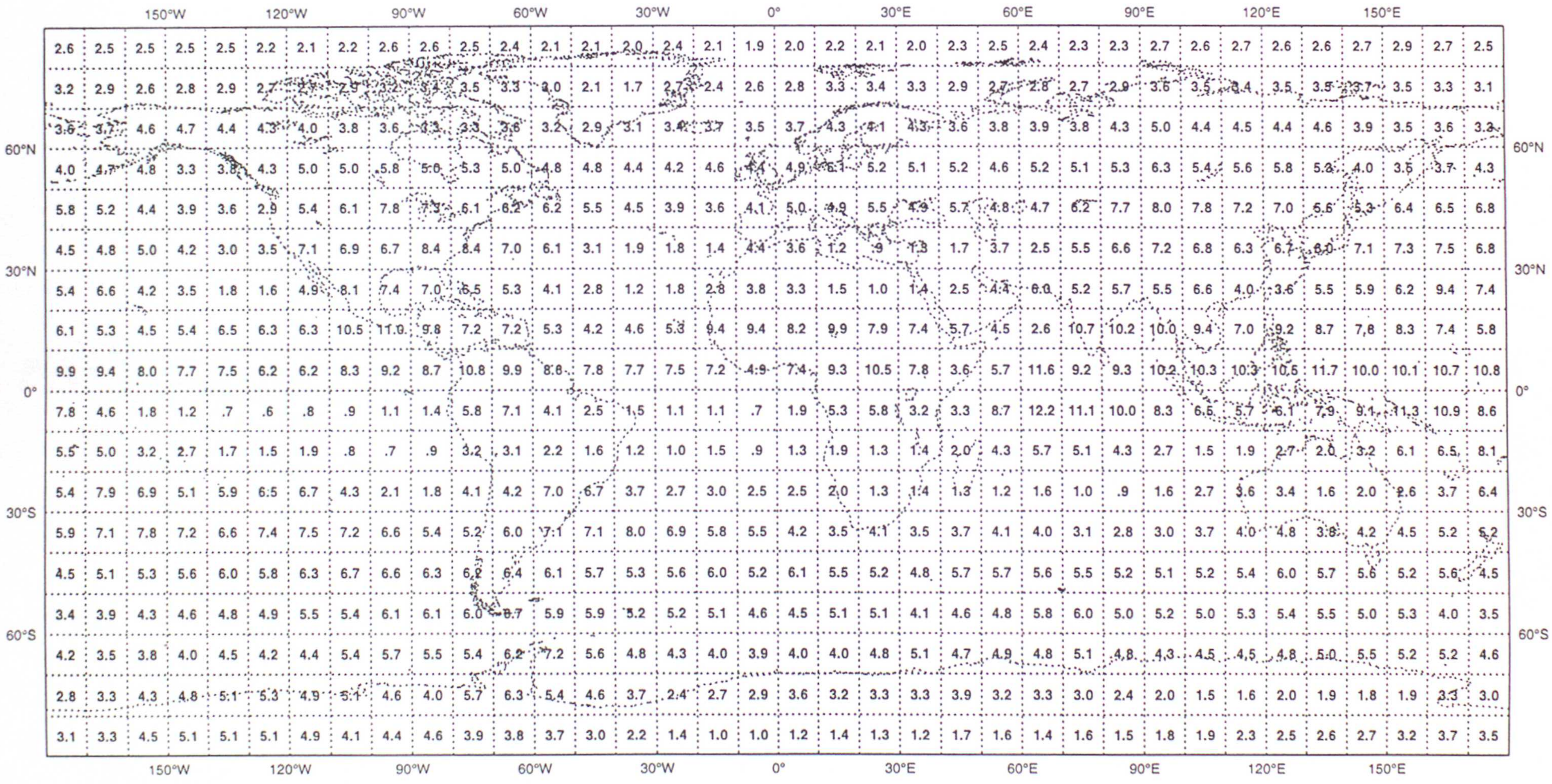
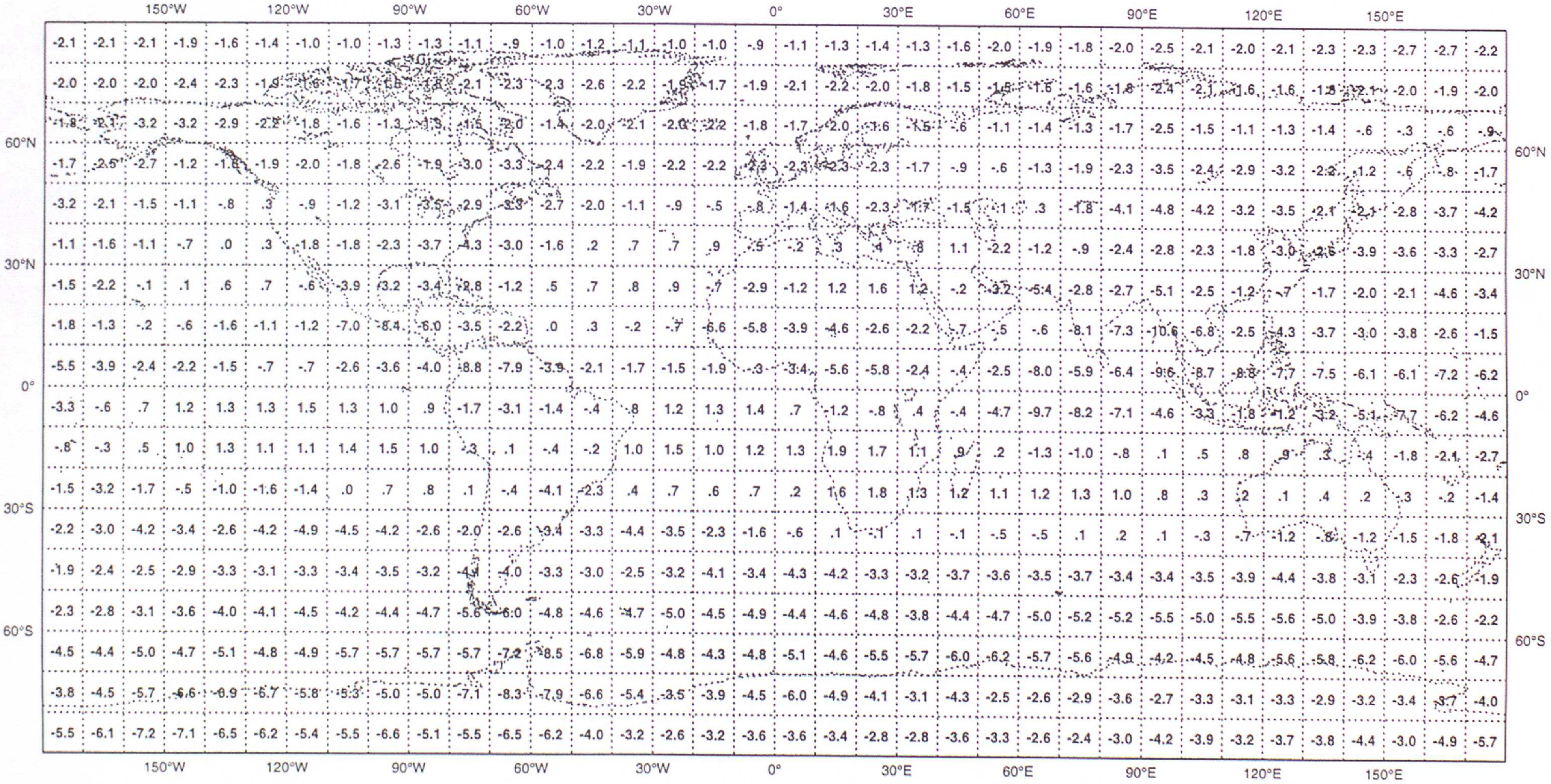

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 44. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA16, using all observations



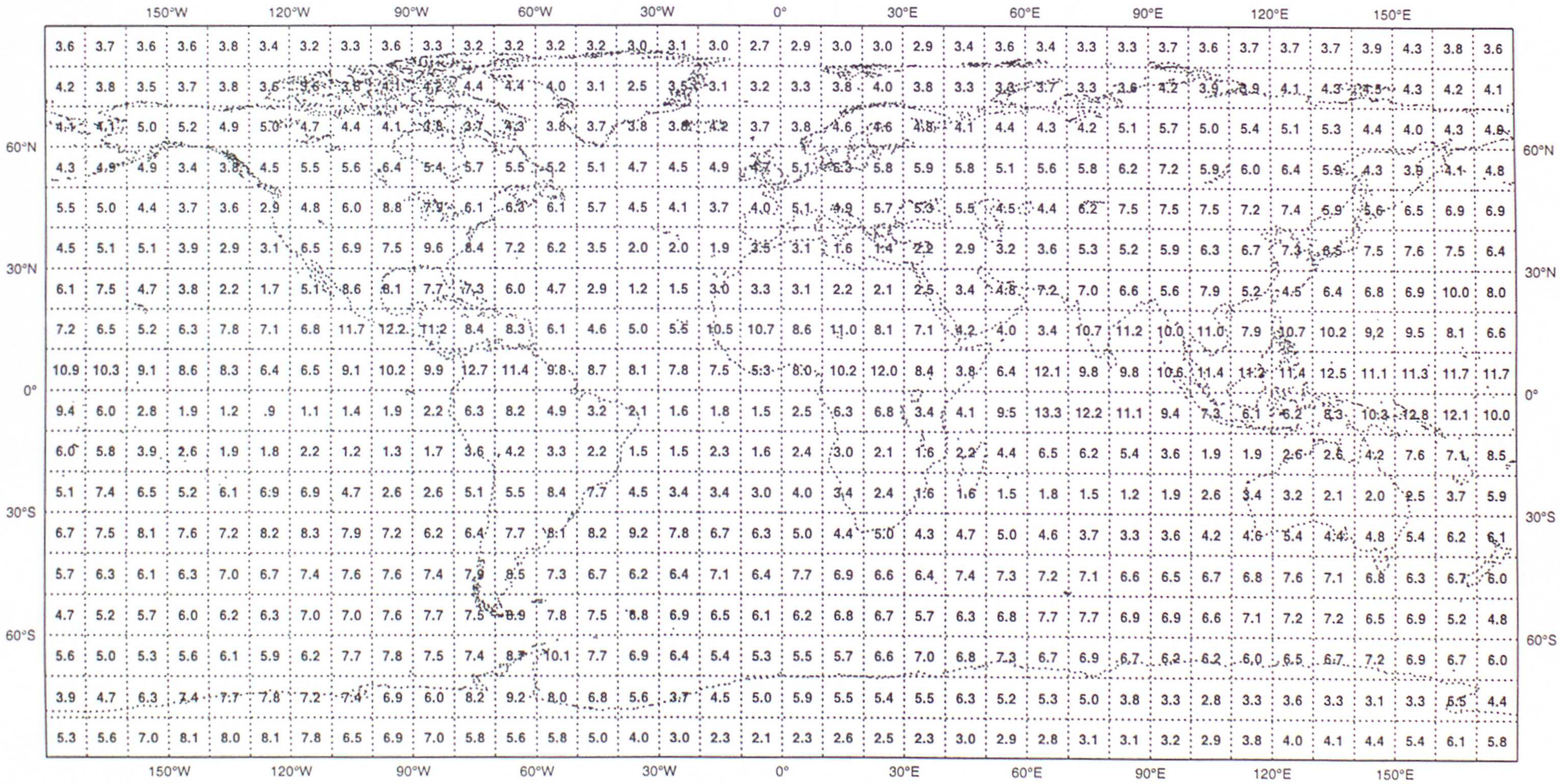
2.6	2.5	2.5	2.5	2.5	2.2	2.1	2.2	2.6	2.6	2.5	2.4	2.1	2.1	2.0	2.4	2.1	1.9	2.0	2.2	2.1	2.0	2.3	2.5	2.4	2.3	2.3	2.7	2.6	2.7	2.6	2.6	2.7	2.9	2.7	2.5
3.2	2.9	2.6	2.8	2.9	2.7	2.7	2.9	3.2	3.4	3.5	3.3	3.0	2.1	1.7	2.7	2.4	2.6	2.8	3.3	3.4	3.3	2.9	2.7	2.8	2.7	2.9	3.6	3.5	3.4	3.5	3.5	3.7	3.5	3.3	3.1
3.6	3.7	4.6	4.7	4.4	4.3	4.0	3.8	3.6	3.3	3.3	3.6	3.2	2.9	3.1	3.4	3.7	3.5	3.7	4.3	4.1	4.3	3.6	3.8	3.9	3.8	4.3	5.0	4.4	4.5	4.4	4.6	3.9	3.5	3.6	3.3
4.0	4.7	4.8	3.3	3.8	4.3	5.0	5.0	5.8	5.0	5.3	5.0	4.8	4.8	4.4	4.2	4.6	4.4	4.9	6.1	5.2	5.1	5.2	4.6	5.2	5.1	5.3	6.3	5.4	5.6	5.8	5.3	4.0	3.5	3.7	4.3
5.8	5.2	4.4	3.9	3.6	2.9	5.4	6.1	7.8	7.3	6.1	6.2	6.2	5.5	4.5	3.9	3.6	4.1	5.0	4.9	5.5	4.9	5.7	4.8	4.7	6.2	7.7	8.0	7.8	7.2	7.0	5.6	5.3	6.4	6.5	6.8
4.5	4.8	5.0	4.2	3.0	3.5	7.1	6.9	6.7	8.4	8.4	7.0	6.1	3.1	1.9	1.8	1.4	4.4	3.6	1.2	.9	1.3	1.7	3.7	2.5	5.5	6.6	7.2	6.8	6.3	6.7	6.0	7.1	7.3	7.5	6.8
5.4	6.6	4.2	3.5	1.8	1.6	4.9	8.1	7.4	7.0	6.5	5.3	4.1	2.8	1.2	1.8	2.8	3.8	3.3	1.5	1.0	1.4	2.5	4.4	6.0	5.2	5.7	5.5	6.6	4.0	3.6	5.5	5.9	6.2	9.4	7.4
6.1	5.3	4.5	5.4	6.5	6.3	6.3	10.5	11.0	9.8	7.2	7.2	5.3	4.2	4.6	5.3	9.4	9.4	8.2	9.9	7.9	7.4	5.7	4.5	2.6	10.7	10.2	10.0	9.4	7.0	9.2	8.7	7.8	8.3	7.4	5.8
9.9	9.4	8.0	7.7	7.5	6.2	6.2	8.3	9.2	8.7	10.8	9.9	8.6	7.8	7.7	7.5	7.2	4.9	7.4	9.3	10.5	7.8	3.6	5.7	11.6	9.2	9.3	10.2	10.3	10.3	10.5	11.7	10.0	10.1	10.7	10.8
7.8	4.6	1.8	1.2	.7	.6	.8	.9	1.1	1.4	5.8	7.1	4.1	2.5	1.5	1.1	1.1	.7	1.9	5.3	5.8	3.2	3.3	8.7	12.2	11.1	10.0	8.3	6.5	5.7	6.1	7.9	9.1	11.3	10.9	8.6
5.5	5.0	3.2	2.7	1.7	1.5	1.9	.8	.7	.9	3.2	3.1	2.2	1.6	1.2	1.0	1.5	.9	1.3	1.9	1.3	1.4	2.0	4.3	5.7	5.1	4.3	2.7	1.5	1.9	2.7	2.0	3.2	6.1	6.5	8.1
5.4	7.9	6.9	5.1	5.9	6.5	6.7	4.3	2.1	1.8	4.1	4.2	7.0	6.7	3.7	2.7	3.0	2.5	2.5	2.0	1.3	1.4	1.3	1.2	1.6	1.0	.9	1.6	2.7	3.6	3.4	1.6	2.0	2.6	3.7	6.4
5.9	7.1	7.8	7.2	6.6	7.4	7.5	7.2	6.6	5.4	5.2	6.0	7.1	7.1	8.0	6.9	5.8	5.5	4.2	3.5	4.1	3.5	3.7	4.1	4.0	3.1	2.8	3.0	3.7	4.0	4.8	3.8	4.2	4.5	5.2	5.2
4.5	5.1	5.3	5.6	6.0	5.8	6.3	6.7	6.6	6.3	6.2	6.4	6.1	5.7	5.3	5.6	6.0	5.2	6.1	5.5	5.2	4.8	5.7	5.7	5.6	5.5	5.2	5.1	5.2	5.4	6.0	5.7	5.6	5.2	5.6	4.5
3.4	3.9	4.3	4.6	4.8	4.9	5.5	5.4	6.1	6.1	6.0	6.7	5.9	5.9	5.2	5.2	5.1	4.6	4.5	5.1	5.1	4.1	4.6	4.8	5.8	6.0	5.0	5.2	5.0	5.3	5.4	5.5	5.0	5.3	4.0	3.5
4.2	3.5	3.8	4.0	4.5	4.2	4.4	5.4	5.7	5.5	5.4	6.2	7.2	5.6	4.8	4.3	4.0	3.9	4.0	4.0	4.8	5.1	4.7	4.9	4.8	5.1	4.8	4.3	4.5	4.5	4.8	5.0	5.5	5.2	5.2	4.6
2.8	3.3	4.3	4.8	5.1	5.3	4.9	5.1	4.6	4.0	5.7	6.3	5.4	4.6	3.7	2.4	2.7	2.9	3.6	3.2	3.3	3.3	3.9	3.2	3.3	3.0	2.4	2.0	1.5	1.6	2.0	1.9	1.8	1.9	3.3	3.0
3.1	3.3	4.5	5.1	5.1	5.1	4.9	4.1	4.4	4.6	3.9	3.8	3.7	3.0	2.2	1.4	1.0	1.0	1.2	1.4	1.3	1.2	1.7	1.6	1.4	1.6	1.5	1.8	1.9	2.3	2.5	2.6	2.7	3.2	3.7	3.5

Figure 45. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



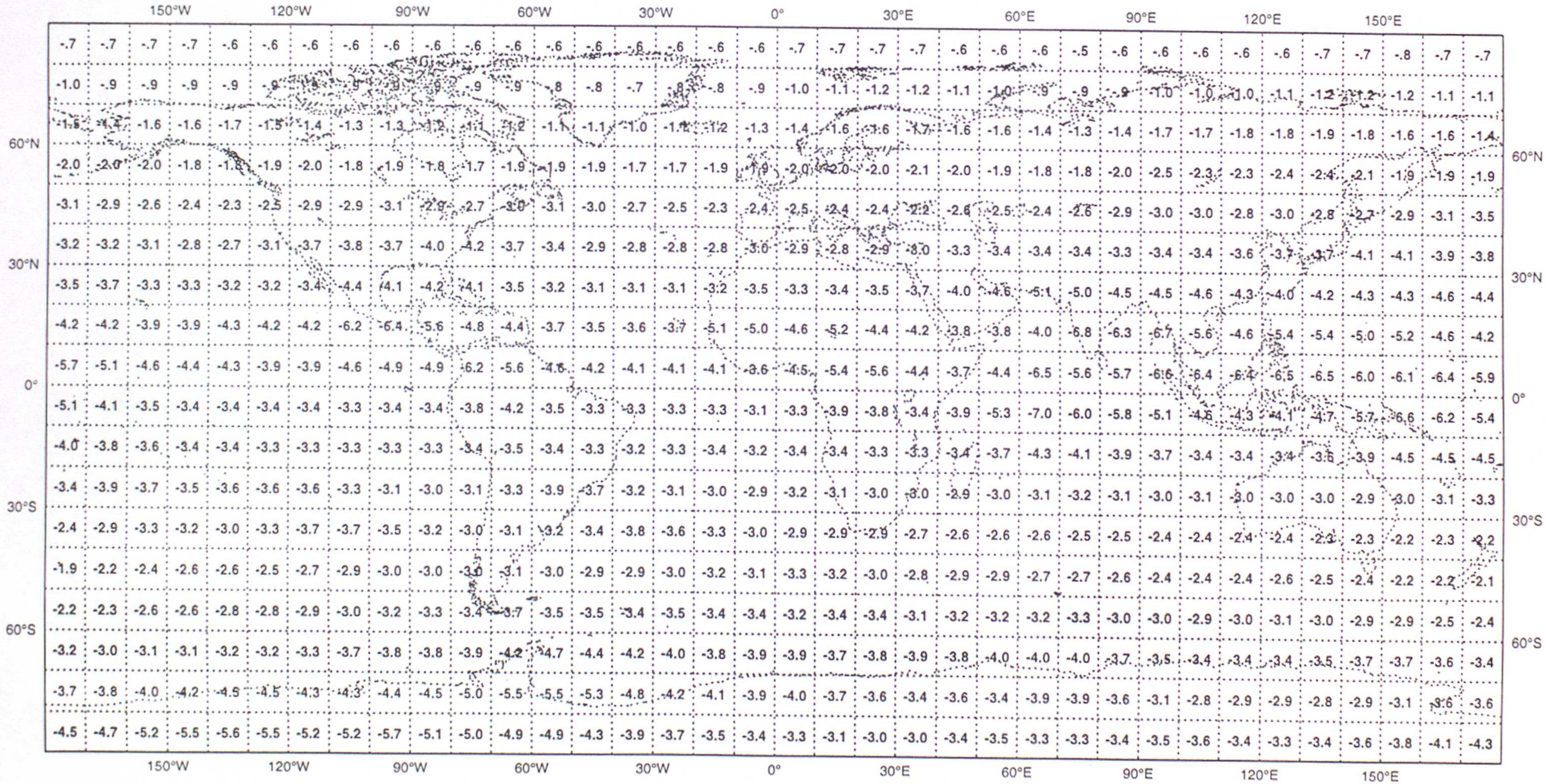
-2.1	-2.1	-2.1	-1.9	-1.6	-1.4	-1.0	-1.0	-1.3	-1.3	-1.1	-.9	-1.0	-1.2	-1.1	-1.0	-1.0	-.9	-1.1	-1.3	-1.4	-1.3	-1.6	-2.0	-1.9	-1.8	-2.0	-2.5	-2.1	-2.0	-2.1	-2.3	-2.3	-2.7	-2.7	-2.2
-2.0	-2.0	-2.0	-2.4	-2.3	-1.9	-1.6	-1.7	-1.8	-1.8	-2.1	-2.3	-2.3	-2.6	-2.2	-1.9	-1.7	-1.9	-2.1	-2.2	-2.0	-1.8	-1.5	-1.5	-1.6	-1.6	-1.8	-2.4	-2.1	-1.6	-1.6	-1.8	-2.1	-2.0	-1.9	-2.0
-1.8	-2.1	-3.2	-3.2	-2.9	-2.2	-1.8	-1.6	-1.3	-1.3	-1.5	-2.0	-1.4	-2.0	-2.1	-2.0	-2.2	-1.8	-1.7	-2.0	-1.6	-1.5	-.6	-1.1	-1.4	-1.3	-1.7	-2.5	-1.5	-1.1	-1.3	-1.4	-.6	-.3	-.6	-.9
-1.7	-2.5	-2.7	-1.2	-1.8	-1.9	-2.0	-1.8	-2.6	-1.9	-3.0	-3.3	-2.4	-2.2	-1.9	-2.2	-2.2	-2.3	-2.3	-2.3	-2.3	-1.7	-.9	-.6	-1.3	-1.9	-2.3	-3.5	-2.4	-2.9	-3.2	-2.2	-1.2	-.6	-.8	-1.7
-3.2	-2.1	-1.5	-1.1	-.8	.3	-.9	-1.2	-3.1	-3.5	-2.9	-3.3	-2.7	-2.0	-1.1	-.9	-.5	-.8	-1.4	-1.6	-2.3	-1.7	-1.5	-.1	.3	-1.8	-4.1	-4.8	-4.2	-3.2	-3.5	-2.1	-2.1	-2.8	-3.7	-4.2
-1.1	-1.6	-1.1	-.7	.0	.3	-1.8	-1.8	-2.3	-3.7	-4.3	-3.0	-1.6	.2	.7	.7	.9	-.5	-.2	.3	.4	.8	1.1	-2.2	-1.2	-.9	-2.4	-2.8	-2.3	-1.8	-3.0	-2.6	-3.9	-3.6	-3.3	-2.7
-1.5	-2.2	-.1	.1	.6	.7	-.6	-3.9	-3.2	-3.4	-2.8	-1.2	.5	.7	.8	.9	-.7	-2.9	-1.2	1.2	1.6	1.2	-.2	-3.2	-5.4	-2.8	-2.7	-5.1	-2.5	-1.2	-.7	-1.7	-2.0	-2.1	-4.6	-3.4
-1.8	-1.3	-.2	-.6	-1.6	-1.1	-1.2	-7.0	-8.4	-6.0	-3.5	-2.2	.0	.3	-.2	-.7	-6.6	-5.8	-3.9	-4.6	-2.6	-2.2	-.7	-.5	-.6	-8.1	-7.3	-10.6	-6.8	-2.5	-4.3	-3.7	-3.0	-3.8	-2.6	-1.5
-5.5	-3.9	-2.4	-2.2	-1.5	-.7	-.7	-2.6	-3.6	-4.0	-8.8	-7.9	-3.9	-2.1	-1.7	-1.5	-1.9	-.3	-3.4	-5.6	-5.8	-2.4	-.4	-2.5	-8.0	-5.9	-6.4	-9.6	-8.7	-8.8	-7.7	-7.5	-6.1	-6.1	-7.2	-6.2
-3.3	-.6	.7	1.2	1.3	1.3	1.5	1.3	1.0	.9	-1.7	-3.1	-1.4	-.4	.8	1.2	1.3	1.4	.7	-1.2	-.8	.4	-.4	-4.7	-9.7	-8.2	-7.1	-4.6	-3.3	-1.8	-1.2	-3.2	-5.1	-7.7	-6.2	-4.6
-.8	-.3	.5	1.0	1.3	1.1	1.1	1.4	1.5	1.0	-.3	.1	-.4	-.2	1.0	1.5	1.0	1.2	1.3	1.9	1.7	1.1	.9	.2	-1.3	-1.0	-.8	.1	.5	.8	.9	.3	-.4	-1.8	-2.1	-2.7
-1.5	-3.2	-1.7	-.5	-1.0	-1.6	-1.4	.0	.7	.8	.1	-.4	-4.1	-2.3	.4	.7	.6	.7	.2	1.6	1.8	1.3	1.2	1.1	1.2	1.3	1.0	.8	.3	.2	.1	.4	.2	-.3	-.2	-1.4
-2.2	-3.0	-4.2	-3.4	-2.6	-4.2	-4.9	-4.5	-4.2	-2.6	-2.0	-2.6	-3.4	-3.3	-4.4	-3.5	-2.3	-1.6	-.6	.1	-.1	.1	-.1	-.5	-.5	.1	.2	.1	-.3	-.7	-1.2	-.8	-1.2	-1.5	-1.8	-2.1
-1.9	-2.4	-2.5	-2.9	-3.3	-3.1	-3.3	-3.4	-3.5	-3.2	-4.1	-4.0	-3.3	-3.0	-2.5	-3.2	-4.1	-3.4	-4.3	-4.2	-3.3	-3.2	-3.7	-3.6	-3.5	-3.7	-3.4	-3.4	-3.5	-3.9	-4.4	-3.8	-3.1	-2.3	-2.6	-1.9
-2.3	-2.8	-3.1	-3.6	-4.0	-4.1	-4.5	-4.2	-4.4	-4.7	-5.6	-6.0	-4.8	-4.6	-4.7	-5.0	-4.5	-4.9	-4.4	-4.6	-4.8	-3.8	-4.4	-4.7	-5.0	-5.2	-5.2	-5.5	-5.0	-5.5	-5.6	-5.0	-3.9	-3.8	-2.6	-2.2
-4.5	-4.4	-5.0	-4.7	-5.1	-4.8	-4.9	-5.7	-5.7	-5.7	-5.7	-7.2	-8.5	-6.8	-5.9	-4.8	-4.3	-4.8	-5.1	-4.6	-5.5	-5.7	-6.0	-6.2	-5.7	-5.6	-4.9	-4.2	-4.5	-4.8	-5.6	-5.8	-6.2	-6.0	-5.6	-4.7
-3.8	-4.5	-5.7	-6.6	-6.9	-6.7	-5.8	-5.3	-5.0	-5.0	-7.1	-8.3	-7.9	-6.6	-5.4	-3.5	-3.9	-4.5	-6.0	-4.9	-4.1	-3.1	-4.3	-2.5	-2.6	-2.9	-3.6	-2.7	-3.3	-3.1	-3.3	-2.9	-3.2	-3.4	-3.7	-4.0
-5.5	-6.1	-7.2	-7.1	-6.5	-6.2	-5.4	-5.5	-6.6	-5.1	-5.5	-6.5	-6.2	-4.0	-3.2	-2.6	-3.2	-3.6	-3.6	-3.4	-2.8	-2.8	-3.6	-3.3	-2.6	-2.4	-3.0	-4.2	-3.9	-3.2	-3.7	-3.8	-4.4	-3.0	-4.9	-5.7

Figure 46. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA16, using all observations



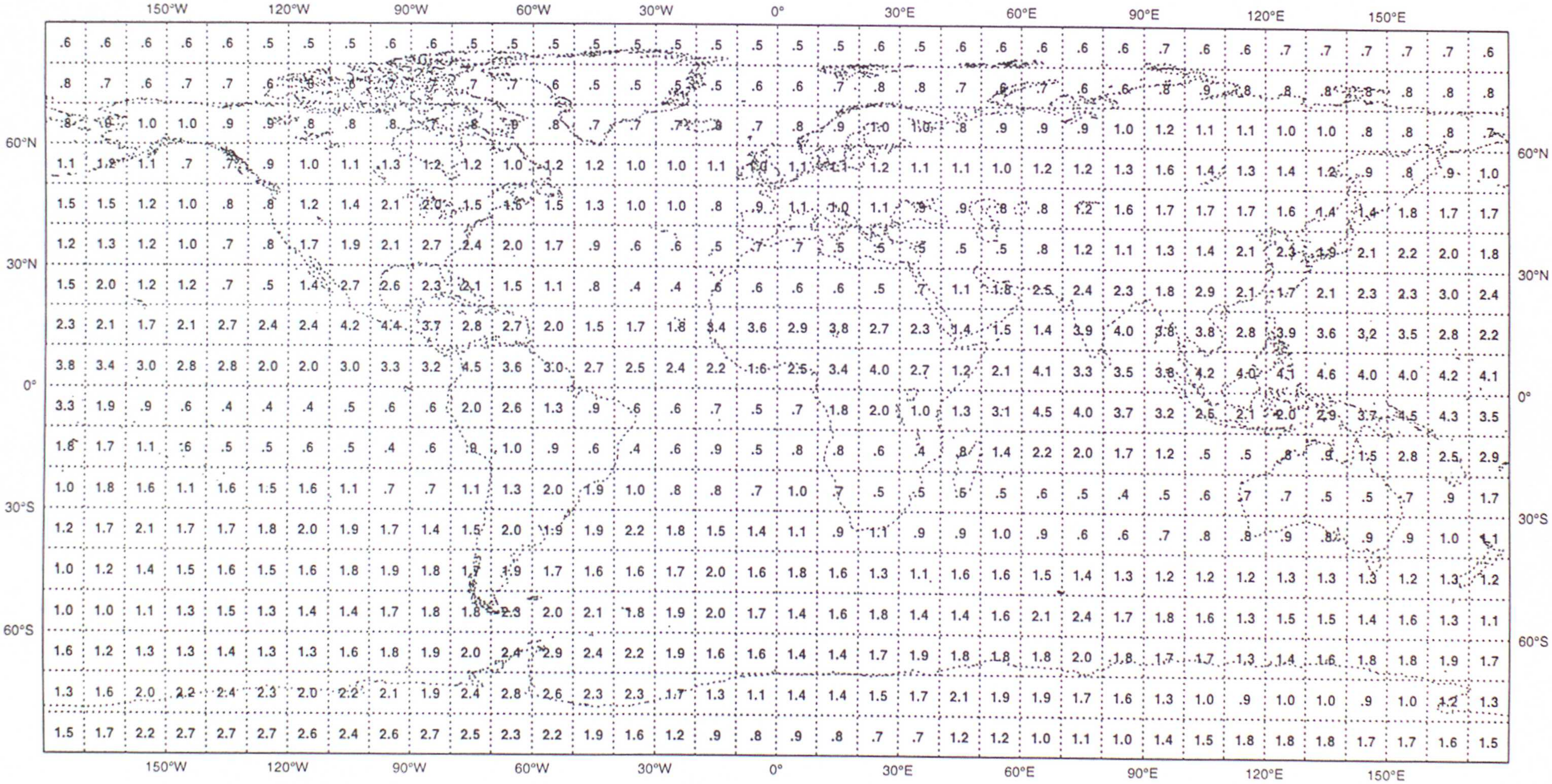
3.6	3.7	3.6	3.6	3.8	3.4	3.2	3.3	3.6	3.3	3.2	3.2	3.2	3.2	3.0	3.1	3.0	2.7	2.9	3.0	3.0	2.9	3.4	3.6	3.4	3.3	3.3	3.7	3.6	3.7	3.7	3.7	3.9	4.3	3.8	3.6
4.2	3.8	3.5	3.7	3.8	3.6	3.6	3.8	4.1	4.2	4.4	4.4	4.0	3.1	2.5	3.5	3.1	3.2	3.3	3.8	4.0	3.8	3.3	3.3	3.7	3.3	3.6	4.2	3.9	3.9	4.1	4.3	4.5	4.3	4.2	4.1
4.1	4.1	5.0	5.2	4.9	5.0	4.7	4.4	4.1	3.8	3.7	4.3	3.8	3.7	3.8	3.8	4.2	3.7	3.8	4.6	4.6	4.8	4.1	4.4	4.3	4.2	5.1	5.7	5.0	5.4	5.1	5.3	4.4	4.0	4.3	4.9
4.3	4.9	4.9	3.4	3.8	4.5	5.5	5.6	6.4	5.4	5.7	5.5	5.2	5.1	4.7	4.5	4.9	4.7	5.1	6.3	5.8	5.9	5.8	5.1	5.6	5.8	6.2	7.2	5.9	6.0	6.4	5.9	4.3	3.9	4.1	4.8
5.5	5.0	4.4	3.7	3.6	2.9	4.8	6.0	8.8	7.9	6.1	6.3	6.1	5.7	4.5	4.1	3.7	4.0	5.1	4.9	5.7	5.3	5.5	4.5	4.4	6.2	7.5	7.5	7.5	7.2	7.4	5.9	5.6	6.5	6.9	6.9
4.5	5.1	5.1	3.9	2.9	3.1	6.5	6.9	7.5	9.6	8.4	7.2	6.2	3.5	2.0	2.0	1.9	3.5	3.1	1.6	1.4	2.2	2.9	3.2	3.6	5.3	5.2	5.9	6.3	6.7	7.3	6.5	7.5	7.6	7.5	6.4
6.1	7.5	4.7	3.8	2.2	1.7	5.1	8.6	8.1	7.7	7.3	6.0	4.7	2.9	1.2	1.5	3.0	3.3	3.1	2.2	2.1	2.5	3.4	4.8	7.2	7.0	6.6	5.6	7.9	5.2	4.5	6.4	6.8	6.9	10.0	8.0
7.2	6.5	5.2	6.3	7.8	7.1	6.8	11.7	12.2	11.2	8.4	8.3	6.1	4.6	5.0	5.5	10.5	10.7	8.6	11.0	8.1	7.1	4.2	4.0	3.4	10.7	11.2	10.0	11.0	7.9	10.7	10.2	9.2	9.5	8.1	6.6
10.9	10.3	9.1	8.6	8.3	6.4	6.5	9.1	10.2	9.9	12.7	11.4	9.8	8.7	8.1	7.8	7.5	5.3	8.0	10.2	12.0	8.4	3.8	6.4	12.1	9.8	9.8	10.6	11.4	11.2	11.4	12.5	11.1	11.3	11.7	11.7
9.4	6.0	2.8	1.9	1.2	.9	1.1	1.4	1.9	2.2	6.3	8.2	4.9	3.2	2.1	1.6	1.8	1.5	2.5	6.3	6.8	3.4	4.1	9.5	13.3	12.2	11.1	9.4	7.3	6.1	6.2	8.3	10.3	12.8	12.1	10.0
6.0	5.8	3.9	2.6	1.9	1.8	2.2	1.2	1.3	1.7	3.6	4.2	3.3	2.2	1.5	1.5	2.3	1.6	2.4	3.0	2.1	1.6	2.2	4.4	6.5	6.2	5.4	3.6	1.9	1.9	2.6	2.6	4.2	7.6	7.1	8.5
5.1	7.4	6.5	5.2	6.1	6.9	6.9	4.7	2.6	2.6	5.1	5.5	8.4	7.7	4.5	3.4	3.4	3.0	4.0	3.4	2.4	1.6	1.6	1.5	1.8	1.5	1.2	1.9	2.6	3.4	3.2	2.1	2.0	2.5	3.7	5.9
6.7	7.5	8.1	7.6	7.2	8.2	8.3	7.9	7.2	6.2	6.4	7.7	8.1	8.2	9.2	7.8	6.7	6.3	5.0	4.4	5.0	4.3	4.7	5.0	4.6	3.7	3.3	3.6	4.2	4.6	5.4	4.4	4.8	5.4	6.2	6.1
5.7	6.3	6.1	6.3	7.0	6.7	7.4	7.6	7.6	7.4	7.9	8.5	7.3	6.7	6.2	6.4	7.1	6.4	7.7	6.9	6.6	6.4	7.4	7.3	7.2	7.1	6.6	6.5	6.7	6.8	7.6	7.1	6.8	6.3	6.7	6.0
4.7	5.2	5.7	6.0	6.2	6.3	7.0	7.0	7.6	7.7	7.5	8.9	7.8	7.5	6.8	6.9	6.5	6.1	6.2	6.8	6.7	5.7	6.3	6.8	7.7	7.7	6.9	6.9	6.6	7.1	7.2	7.2	6.5	6.9	5.2	4.8
5.6	5.0	5.3	5.6	6.1	5.9	6.2	7.7	7.8	7.5	7.4	8.7	10.1	7.7	6.9	6.4	5.4	5.3	5.5	5.7	6.6	7.0	6.8	7.3	6.7	6.9	6.7	6.2	6.2	6.0	6.5	6.7	7.2	6.9	6.7	6.0
3.9	4.7	6.3	7.4	7.7	7.8	7.2	7.4	6.9	6.0	8.2	9.2	8.0	6.8	5.6	3.7	4.5	5.0	5.9	5.5	5.4	5.5	6.3	5.2	5.3	5.0	3.8	3.3	2.8	3.3	3.6	3.3	3.1	3.3	5.5	4.4
5.3	5.6	7.0	8.1	8.0	8.1	7.8	6.5	6.9	7.0	5.8	5.6	5.8	5.0	4.0	3.0	2.3	2.1	2.3	2.6	2.5	2.3	3.0	2.9	2.8	3.1	3.1	3.2	2.9	3.8	4.0	4.1	4.4	5.4	6.1	5.8

Figure 47. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



-.7	-.7	-.7	-.7	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.6	-.7	-.7	-.7	-.7	-.6	-.6	-.6	-.5	-.6	-.6	-.6	-.6	-.6	-.7	-.7	-.8	-.7	-.7
-1.0	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.9	-.8	-.8	-.7	-.8	-.8	-.9	-1.0	-1.1	-1.2	-1.2	-1.1	-1.0	-.9	-.9	-.9	-1.0	-1.0	-1.0	-1.1	-1.2	-1.2	-1.2	-1.1	-1.1
-1.5	-1.4	-1.6	-1.6	-1.7	-1.5	-1.4	-1.3	-1.3	-1.2	-1.1	-1.2	-1.1	-1.1	-1.0	-1.1	-1.2	-1.3	-1.4	-1.6	-1.6	-1.7	-1.6	-1.6	-1.4	-1.3	-1.4	-1.7	-1.7	-1.8	-1.8	-1.9	-1.8	-1.6	-1.6	-1.4
-2.0	-2.0	-2.0	-1.8	-1.8	-1.9	-2.0	-1.8	-1.9	-1.8	-1.7	-1.9	-1.9	-1.9	-1.7	-1.7	-1.9	-1.9	-2.0	-2.0	-2.0	-2.1	-2.0	-1.9	-1.8	-1.8	-2.0	-2.5	-2.3	-2.3	-2.4	-2.4	-2.1	-1.9	-1.9	-1.9
-3.1	-2.9	-2.6	-2.4	-2.3	-2.5	-2.9	-2.9	-3.1	-2.9	-2.7	-3.0	-3.1	-3.0	-2.7	-2.5	-2.3	-2.4	-2.5	-2.4	-2.4	-2.2	-2.6	-2.5	-2.4	-2.6	-2.9	-3.0	-3.0	-2.8	-3.0	-2.8	-2.7	-2.9	-3.1	-3.5
-3.2	-3.2	-3.1	-2.8	-2.7	-3.1	-3.7	-3.8	-3.7	-4.0	-4.2	-3.7	-3.4	-2.9	-2.8	-2.8	-2.8	-3.0	-2.9	-2.8	-2.9	-3.0	-3.3	-3.4	-3.4	-3.4	-3.3	-3.4	-3.4	-3.6	-3.7	-3.7	-4.1	-4.1	-3.9	-3.8
-3.5	-3.7	-3.3	-3.3	-3.2	-3.2	-3.4	-4.4	-4.1	-4.2	-4.1	-3.5	-3.2	-3.1	-3.1	-3.1	-3.2	-3.5	-3.3	-3.4	-3.5	-3.7	-4.0	-4.6	-5.1	-5.0	-4.5	-4.5	-4.6	-4.3	-4.0	-4.2	-4.3	-4.3	-4.6	-4.4
-4.2	-4.2	-3.9	-3.9	-4.3	-4.2	-4.2	-6.2	-6.4	-5.6	-4.8	-4.4	-3.7	-3.5	-3.6	-3.7	-5.1	-5.0	-4.6	-5.2	-4.4	-4.2	-3.8	-3.8	-4.0	-6.8	-6.3	-6.7	-5.6	-4.6	-5.4	-5.4	-5.0	-5.2	-4.6	-4.2
-5.7	-5.1	-4.6	-4.4	-4.3	-3.9	-3.9	-4.6	-4.9	-4.9	-6.2	-5.6	-4.6	-4.2	-4.1	-4.1	-4.1	-3.6	-4.5	-5.4	-5.6	-4.4	-3.7	-4.4	-6.5	-5.6	-5.7	-6.6	-6.4	-6.4	-6.5	-6.5	-6.0	-6.1	-6.4	-5.9
-5.1	-4.1	-3.5	-3.4	-3.4	-3.4	-3.4	-3.3	-3.4	-3.4	-3.8	-4.2	-3.5	-3.3	-3.3	-3.3	-3.3	-3.1	-3.3	-3.9	-3.8	-3.4	-3.9	-5.3	-7.0	-6.0	-5.8	-5.1	-4.6	-4.3	-4.1	-4.7	-5.7	-6.6	-6.2	-5.4
-4.0	-3.8	-3.6	-3.4	-3.4	-3.3	-3.3	-3.3	-3.3	-3.3	-3.4	-3.5	-3.4	-3.3	-3.2	-3.3	-3.4	-3.2	-3.4	-3.4	-3.3	-3.3	-3.4	-3.7	-4.3	-4.1	-3.9	-3.7	-3.4	-3.4	-3.4	-3.5	-3.9	-4.5	-4.5	-4.5
-3.4	-3.9	-3.7	-3.5	-3.6	-3.6	-3.6	-3.3	-3.1	-3.0	-3.1	-3.3	-3.9	-3.7	-3.2	-3.1	-3.0	-2.9	-3.2	-3.1	-3.0	-3.0	-2.9	-3.0	-3.1	-3.2	-3.1	-3.0	-3.1	-3.0	-3.0	-3.0	-2.9	-3.0	-3.1	-3.3
-2.4	-2.9	-3.3	-3.2	-3.0	-3.3	-3.7	-3.7	-3.5	-3.2	-3.0	-3.1	-3.2	-3.4	-3.8	-3.6	-3.3	-3.0	-2.9	-2.9	-2.9	-2.7	-2.6	-2.6	-2.6	-2.5	-2.5	-2.4	-2.4	-2.4	-2.4	-2.3	-2.3	-2.2	-2.3	-2.2
-1.9	-2.2	-2.4	-2.6	-2.6	-2.5	-2.7	-2.9	-3.0	-3.0	-3.0	-3.1	-3.0	-2.9	-2.9	-3.0	-3.2	-3.1	-3.3	-3.2	-3.0	-2.8	-2.9	-2.9	-2.7	-2.7	-2.6	-2.4	-2.4	-2.4	-2.6	-2.5	-2.4	-2.2	-2.2	-2.1
-2.2	-2.3	-2.6	-2.6	-2.8	-2.8	-2.9	-3.0	-3.2	-3.3	-3.4	-3.7	-3.5	-3.5	-3.4	-3.5	-3.4	-3.4	-3.2	-3.4	-3.4	-3.1	-3.2	-3.2	-3.2	-3.3	-3.0	-3.0	-2.9	-3.0	-3.1	-3.0	-2.9	-2.9	-2.5	-2.4
-3.2	-3.0	-3.1	-3.1	-3.2	-3.2	-3.3	-3.7	-3.8	-3.8	-3.9	-4.2	-4.7	-4.4	-4.2	-4.0	-3.8	-3.9	-3.9	-3.7	-3.8	-3.9	-3.8	-4.0	-4.0	-4.0	-3.7	-3.5	-3.4	-3.4	-3.4	-3.5	-3.7	-3.7	-3.6	-3.4
-3.7	-3.8	-4.0	-4.2	-4.5	-4.5	-4.3	-4.3	-4.4	-4.5	-5.0	-5.5	-5.5	-5.3	-4.8	-4.2	-4.1	-3.9	-4.0	-3.7	-3.6	-3.4	-3.6	-3.4	-3.9	-3.9	-3.6	-3.1	-2.8	-2.9	-2.9	-2.8	-2.9	-3.1	-3.6	-3.6
-4.5	-4.7	-5.2	-5.5	-5.6	-5.5	-5.2	-5.2	-5.7	-5.1	-5.0	-4.9	-4.9	-4.3	-3.9	-3.7	-3.5	-3.4	-3.3	-3.1	-3.0	-3.0	-3.4	-3.5	-3.3	-3.3	-3.4	-3.5	-3.6	-3.4	-3.3	-3.4	-3.6	-3.8	-4.1	-4.3

Figure 48. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA16, using all observations



.6	.6	.6	.6	.6	.5	.5	.5	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.6	.6	.6	.6	.6	.7	.6	.6	.7	.7	.7	.7	.7	.6
.8	.7	.6	.7	.7	.6	.8	.6	.7	.7	.7	.7	.6	.5	.5	.5	.5	.6	.6	.7	.8	.8	.7	.6	.7	.6	.6	.8	.9	.8	.8	.8	.8	.8	.8	.8
.8	.6	1.0	1.0	.9	.9	.8	.8	.8	.7	.8	.9	.8	.7	.7	.7	.8	.7	.8	.9	1.0	1.0	.8	.9	.9	.9	1.0	1.2	1.1	1.1	1.0	1.0	.8	.8	.8	.7
1.1	1.2	1.1	.7	.7	.9	1.0	1.1	1.3	1.2	1.2	1.0	1.2	1.2	1.0	1.0	1.1	1.0	1.1	1.1	1.2	1.1	1.1	1.0	1.2	1.2	1.3	1.6	1.4	1.3	1.4	1.2	.9	.8	.9	1.0
1.5	1.5	1.2	1.0	.8	.8	1.2	1.4	2.1	2.0	1.5	1.6	1.5	1.3	1.0	1.0	.8	.9	1.1	1.0	1.1	.9	.9	.8	.8	1.2	1.6	1.7	1.7	1.7	1.6	1.4	1.4	1.8	1.7	1.7
1.2	1.3	1.2	1.0	.7	.8	1.7	1.9	2.1	2.7	2.4	2.0	1.7	.9	.6	.6	.5	.7	.7	.5	.5	.5	.5	.5	.8	1.2	1.1	1.3	1.4	2.1	2.3	1.9	2.1	2.2	2.0	1.8
1.5	2.0	1.2	1.2	.7	.5	1.4	2.7	2.6	2.3	2.1	1.5	1.1	.8	.4	.4	.6	.6	.6	.6	.5	.7	1.1	1.8	2.5	2.4	2.3	1.8	2.9	2.1	1.7	2.1	2.3	2.3	3.0	2.4
2.3	2.1	1.7	2.1	2.7	2.4	2.4	4.2	4.4	3.7	2.8	2.7	2.0	1.5	1.7	1.8	3.4	3.6	2.9	3.8	2.7	2.3	1.4	1.5	1.4	3.9	4.0	3.8	3.8	2.8	3.9	3.6	3.2	3.5	2.8	2.2
3.8	3.4	3.0	2.8	2.8	2.0	2.0	3.0	3.3	3.2	4.5	3.6	3.0	2.7	2.5	2.4	2.2	1.6	2.5	3.4	4.0	2.7	1.2	2.1	4.1	3.3	3.5	3.8	4.2	4.0	4.1	4.6	4.0	4.0	4.2	4.1
3.3	1.9	.9	.6	.4	.4	.4	.5	.6	.6	2.0	2.6	1.3	.9	.6	.6	.7	.5	.7	1.8	2.0	1.0	1.3	3.1	4.5	4.0	3.7	3.2	2.5	2.1	2.0	2.9	3.7	4.5	4.3	3.5
1.8	1.7	1.1	.6	.5	.5	.6	.5	.4	.6	.8	1.0	.9	.6	.4	.6	.9	.5	.8	.8	.6	.4	.8	1.4	2.2	2.0	1.7	1.2	.5	.5	.8	.9	1.5	2.8	2.5	2.9
1.0	1.8	1.6	1.1	1.6	1.5	1.6	1.1	.7	.7	1.1	1.3	2.0	1.9	1.0	.8	.8	.7	1.0	.7	.5	.5	.5	.5	.6	.5	.4	.5	.6	.7	.7	.5	.5	.7	.9	1.7
1.2	1.7	2.1	1.7	1.7	1.8	2.0	1.9	1.7	1.4	1.5	2.0	1.9	1.9	2.2	1.8	1.5	1.4	1.1	.9	1.1	.9	.9	1.0	.9	.6	.6	.7	.8	.8	.9	.8	.9	.9	1.0	1.1
1.0	1.2	1.4	1.5	1.6	1.5	1.6	1.8	1.9	1.8	1.7	1.9	1.7	1.6	1.6	1.7	2.0	1.6	1.8	1.6	1.3	1.1	1.6	1.6	1.5	1.4	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.2	1.3	1.2
1.0	1.0	1.1	1.3	1.5	1.3	1.4	1.4	1.7	1.8	1.8	2.3	2.0	2.1	1.8	1.9	2.0	1.7	1.4	1.6	1.8	1.4	1.4	1.6	2.1	2.4	1.7	1.8	1.6	1.3	1.5	1.5	1.4	1.6	1.3	1.1
1.6	1.2	1.3	1.3	1.4	1.3	1.3	1.6	1.8	1.9	2.0	2.4	2.9	2.4	2.2	1.9	1.6	1.6	1.4	1.4	1.7	1.9	1.8	1.8	1.8	2.0	1.8	1.7	1.7	1.3	1.4	1.6	1.8	1.8	1.9	1.7
1.3	1.6	2.0	2.2	2.4	2.3	2.0	2.2	2.1	1.9	2.4	2.8	2.6	2.3	2.3	1.7	1.3	1.1	1.4	1.4	1.5	1.7	2.1	1.9	1.9	1.7	1.6	1.3	1.0	.9	1.0	1.0	.9	1.0	1.2	1.3
1.5	1.7	2.2	2.7	2.7	2.7	2.6	2.4	2.6	2.7	2.5	2.3	2.2	1.9	1.6	1.2	.9	.8	.9	.8	.7	.7	1.2	1.2	1.0	1.1	1.0	1.4	1.5	1.8	1.8	1.8	1.7	1.7	1.6	1.5

Figure 49. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations

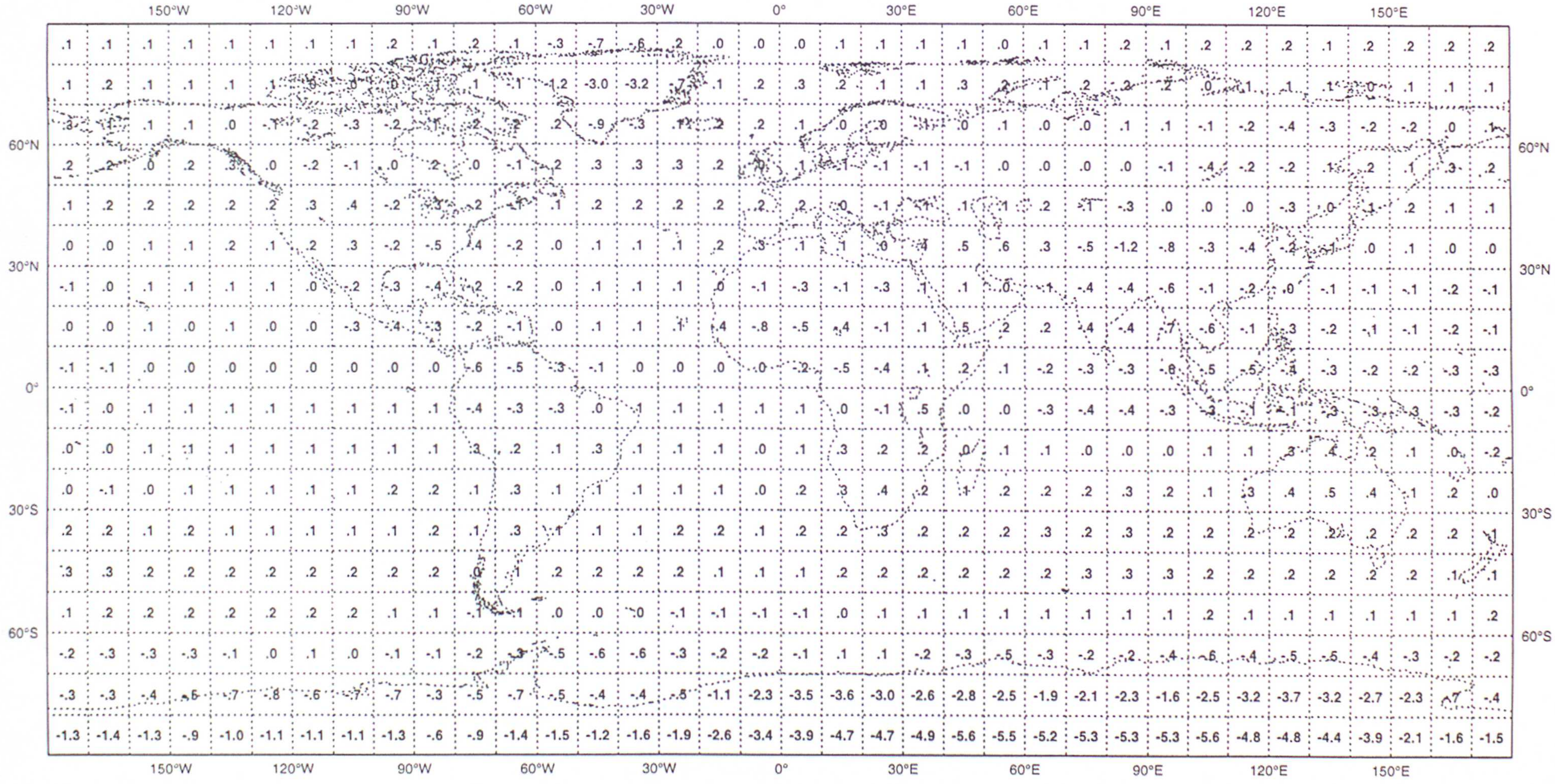
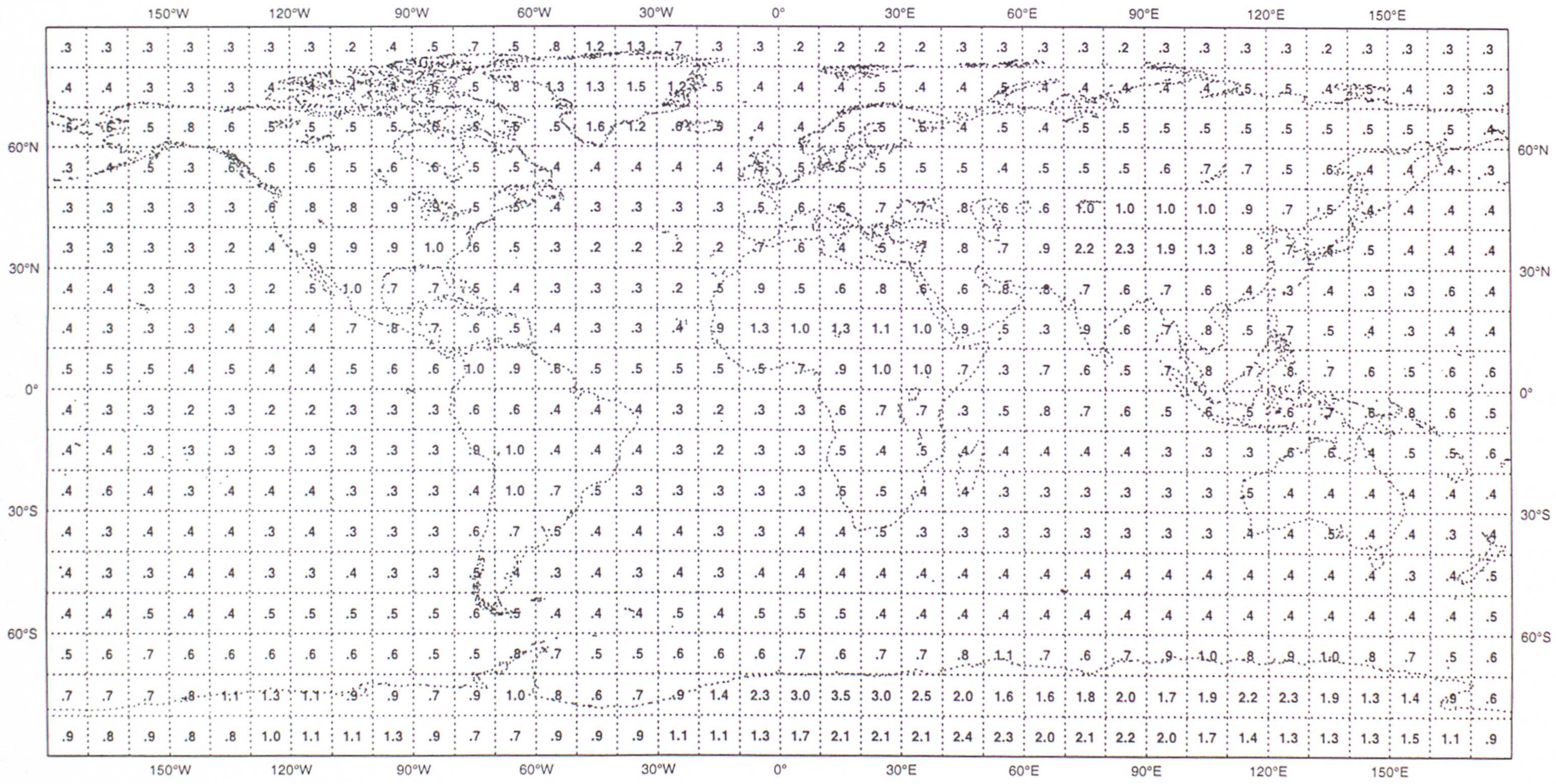

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.1 .1 .1 .1 .1 .1 .1 .1 .2 .1 .2 .1 -.3 -.7 -.6 .2 .0 .0 .0 .1 .1 .1 .1 .0 .1 .1 .2 .1 .2 .2 .2 .1 .2 .2 .2 .2
.1 .2 .1 .1 .1 .1 .0 .0 .0 .1 .1 -.1 -1.2 -3.0 -3.2 -.7 .1 .2 .3 .2 .1 .1 .3 .2 .1 .2 .2 .2 .0 .1 .1 .1 .0 .1 .1 .1
.3 .1 .1 .1 .0 -.1 -.2 -.3 -.2 -.1 .2 .2 .2 -.9 -.3 .1 .2 .2 .1 .0 .0 -.1 .0 .1 .0 .0 .1 .1 -.1 -.2 -.4 -.3 -.2 -.2 .0 .1
.2 .2 .0 .2 .3 .0 -.2 -.1 .0 .2 .0 -.1 .2 .3 .3 .3 .2 .0 .1 -.1 -.1 -.1 -.1 .0 .0 .0 .0 -.1 -.4 -.2 -.2 .1 .2 .1 .3 .2
.1 .2 .2 .2 .2 .2 .3 .4 -.2 -.3 -.2 -.1 .1 .2 .2 .2 .2 .2 .2 .0 -.1 -.1 .1 .1 .2 .1 -.3 .0 .0 .0 -.3 .0 .1 .2 .1 .1
.0 .0 .1 .1 .2 .1 .2 .3 -.2 -.5 .4 -.2 .0 .1 .1 .1 .2 .3 .1 .1 .0 .4 .5 .6 .3 -.5 -1.2 -.8 -.3 -.4 -.2 -.1 .0 .1 .0 .0
-.1 .0 .1 .1 .1 .1 .0 -.2 -.3 -.4 -.2 -.2 .0 .1 .1 .1 .0 -.1 -.3 -.1 -.3 .1 .1 .0 -.1 -.4 -.4 -.6 -.1 -.2 .0 -.1 -.1 -.1 -.2 -.1
.0 .0 .1 .0 .1 .0 .0 -.3 -.4 -.3 -.2 -.1 .0 .1 .1 .1 .4 -.8 -.5 .4 -.1 .1 .5 .2 .2 -.4 -.4 -.7 -.6 -.1 -.3 -.2 -.1 -.1 -.2 -.1
-.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 -.6 -.5 -.3 -.1 .0 .0 .0 .0 -.2 -.5 -.4 .1 .2 .1 -.2 -.3 -.3 -.8 -.5 -.5 -.4 -.3 -.2 -.2 -.3 -.3
-.1 .0 .1 .1 .1 .1 .1 .1 .1 .1 -.4 -.3 -.3 .0 .1 .1 .1 .1 .1 .0 -.1 .5 .0 .0 -.3 -.4 -.4 -.3 -.3 -.1 -.1 -.3 -.3 -.3 -.3 -.2
.0 .0 .1 .1 .1 .1 .1 .1 .1 .1 .3 .2 .1 .3 .1 .1 .1 .0 .1 .3 .2 .2 .0 .1 .1 .0 .0 .0 .1 .1 .3 .4 .2 .1 .0 -.2
.0 -.1 .0 .1 .1 .1 .1 .1 .2 .2 .1 .3 .1 .1 .1 .1 .1 .0 .2 .3 .4 .2 .1 .2 .2 .2 .3 .2 .1 .3 .4 .5 .4 .1 .2 .0
.2 .2 .1 .2 .1 .1 .1 .1 .1 .2 .1 .3 .1 .1 .1 .2 .2 .1 .2 .2 .3 .2 .2 .2 .3 .2 .3 .2 .2 .2 .2 .2 .2 .2 .2 .1
.3 .3 .2 .2 .2 .2 .2 .2 .2 .2 .0 .1 .2 .2 .2 .2 .1 .1 .1 .2 .2 .2 .2 .2 .2 .3 .3 .3 .2 .2 .2 .2 .2 .2 .1 .1
.1 .2 .2 .2 .2 .2 .2 .2 .1 .1 -.1 -.1 .0 .0 .0 -.1 -.1 -.1 -.1 .0 .1 .1 .1 .1 .1 .1 .1 .1 .2 .1 .1 .1 .1 .1 .1 .2
-.2 -.3 -.3 -.3 -.1 .0 .1 .0 -.1 -.1 -.2 -.3 -.5 -.6 -.6 -.3 -.2 -.2 -.1 .1 .1 -.2 -.3 -.5 -.3 -.2 -.2 -.4 -.6 -.4 -.5 -.5 -.4 -.3 -.2 -.2
-.3 -.3 -.4 -.5 -.7 -.8 -.6 -.7 -.7 -.3 -.5 -.7 -.5 -.4 -.4 -.5 -1.1 -2.3 -3.5 -3.6 -3.0 -2.6 -2.8 -2.5 -1.9 -2.1 -2.3 -1.6 -2.5 -3.2 -3.7 -3.2 -2.7 -2.3 -.7 -.4
-1.3 -1.4 -1.3 -.9 -1.0 -1.1 -1.1 -1.1 -1.3 -.6 -.9 -1.4 -1.5 -1.2 -1.6 -1.9 -2.6 -3.4 -3.9 -4.7 -4.7 -4.9 -5.6 -5.5 -5.2 -5.3 -5.3 -5.3 -5.6 -4.8 -4.8 -4.4 -3.9 -2.1 -1.6 -1.5

Figure 50. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA16, using all observations



.3	.3	.3	.3	.3	.3	.3	.2	.4	.5	.7	.5	.8	1.2	1.3	.7	.3	.3	.2	.2	.2	.2	.3	.3	.3	.3	.2	.3	.3	.3	.3	.2	.3	.3	.3	.3
.4	.4	.3	.3	.3	.4	.4	.4	.4	.6	.5	.8	1.3	1.3	1.5	1.2	.5	.4	.4	.4	.5	.4	.4	.5	.4	.4	.4	.4	.4	.5	.5	.4	.5	.4	.3	.3
.5	.6	.5	.8	.6	.5	.5	.5	.5	.6	.5	.5	.5	1.6	1.2	.6	.5	.4	.4	.5	.5	.5	.4	.5	.4	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.4
.3	.4	.5	.3	.6	.6	.6	.5	.6	.6	.5	.5	.4	.4	.4	.4	.4	.5	.5	.5	.5	.5	.5	.4	.5	.5	.5	.6	.7	.7	.5	.6	.4	.4	.4	.3
.3	.3	.3	.3	.3	.6	.8	.8	.9	.9	.5	.5	.4	.3	.3	.3	.3	.5	.6	.6	.7	.7	.8	.6	.6	1.0	1.0	1.0	1.0	.9	.7	.5	.4	.4	.4	.4
.3	.3	.3	.3	.2	.4	.9	.9	.9	1.0	.6	.5	.3	.2	.2	.2	.2	.7	.6	.4	.5	.7	.8	.7	.9	2.2	2.3	1.9	1.3	.8	.7	.6	.5	.4	.4	.4
.4	.4	.3	.3	.3	.2	.5	1.0	.7	.7	.5	.4	.3	.3	.3	.2	.5	.9	.5	.6	.8	.6	.6	.8	.8	.7	.6	.7	.6	.4	.3	.4	.3	.3	.6	.4
.4	.3	.3	.3	.4	.4	.4	.7	.8	.7	.6	.5	.4	.3	.3	.4	.9	1.3	1.0	1.3	1.1	1.0	.9	.5	.3	.9	.6	.7	.8	.5	.7	.5	.4	.3	.4	.4
.5	.5	.5	.4	.5	.4	.4	.5	.6	.6	1.0	.9	.8	.5	.5	.5	.5	.5	.7	.9	1.0	1.0	.7	.3	.7	.6	.5	.7	.8	.7	.8	.7	.6	.5	.6	.6
.4	.3	.3	.2	.3	.2	.2	.3	.3	.3	.6	.6	.4	.4	.4	.3	.2	.3	.3	.6	.7	.7	.3	.5	.8	.7	.6	.5	.6	.5	.6	.7	.6	.8	.6	.5
.4	.4	.3	.3	.3	.3	.3	.3	.3	.3	.9	1.0	.4	.4	.4	.3	.2	.3	.3	.5	.4	.5	.4	.4	.4	.4	.4	.3	.3	.3	.6	.6	.4	.5	.5	.6
.4	.6	.4	.3	.4	.4	.4	.3	.3	.3	.4	1.0	.7	.5	.3	.3	.3	.3	.3	.5	.5	.4	.4	.3	.3	.3	.3	.3	.3	.5	.4	.4	.4	.4	.4	.4
.4	.3	.4	.4	.4	.3	.4	.3	.3	.3	.6	.7	.5	.4	.4	.4	.3	.3	.4	.4	.5	.3	.3	.3	.3	.3	.3	.3	.3	.4	.4	.5	.4	.4	.3	.4
.4	.3	.3	.4	.4	.3	.3	.4	.3	.3	.5	.4	.3	.4	.3	.4	.3	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.3	.4	.5
.4	.4	.5	.4	.4	.5	.5	.5	.5	.5	.6	.5	.4	.4	.4	.5	.4	.5	.5	.5	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.4	.5
.5	.6	.7	.6	.6	.6	.6	.6	.6	.5	.5	.8	.7	.5	.5	.6	.6	.6	.7	.6	.7	.7	.8	1.1	.7	.6	.7	.9	1.0	.8	.9	1.0	.8	.7	.5	.6
.7	.7	.7	.8	1.1	1.3	1.1	.9	.9	.7	.9	1.0	.8	.6	.7	.9	1.4	2.3	3.0	3.5	3.0	2.5	2.0	1.6	1.6	1.8	2.0	1.7	1.9	2.2	2.3	1.9	1.3	1.4	.9	.6
.9	.8	.9	.8	.8	1.0	1.1	1.1	1.3	.9	.7	.7	.9	.9	.9	1.1	1.1	1.3	1.7	2.1	2.1	2.1	2.4	2.3	2.0	2.1	2.2	2.0	1.7	1.4	1.3	1.3	1.3	1.5	1.1	.9

Figure 51. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

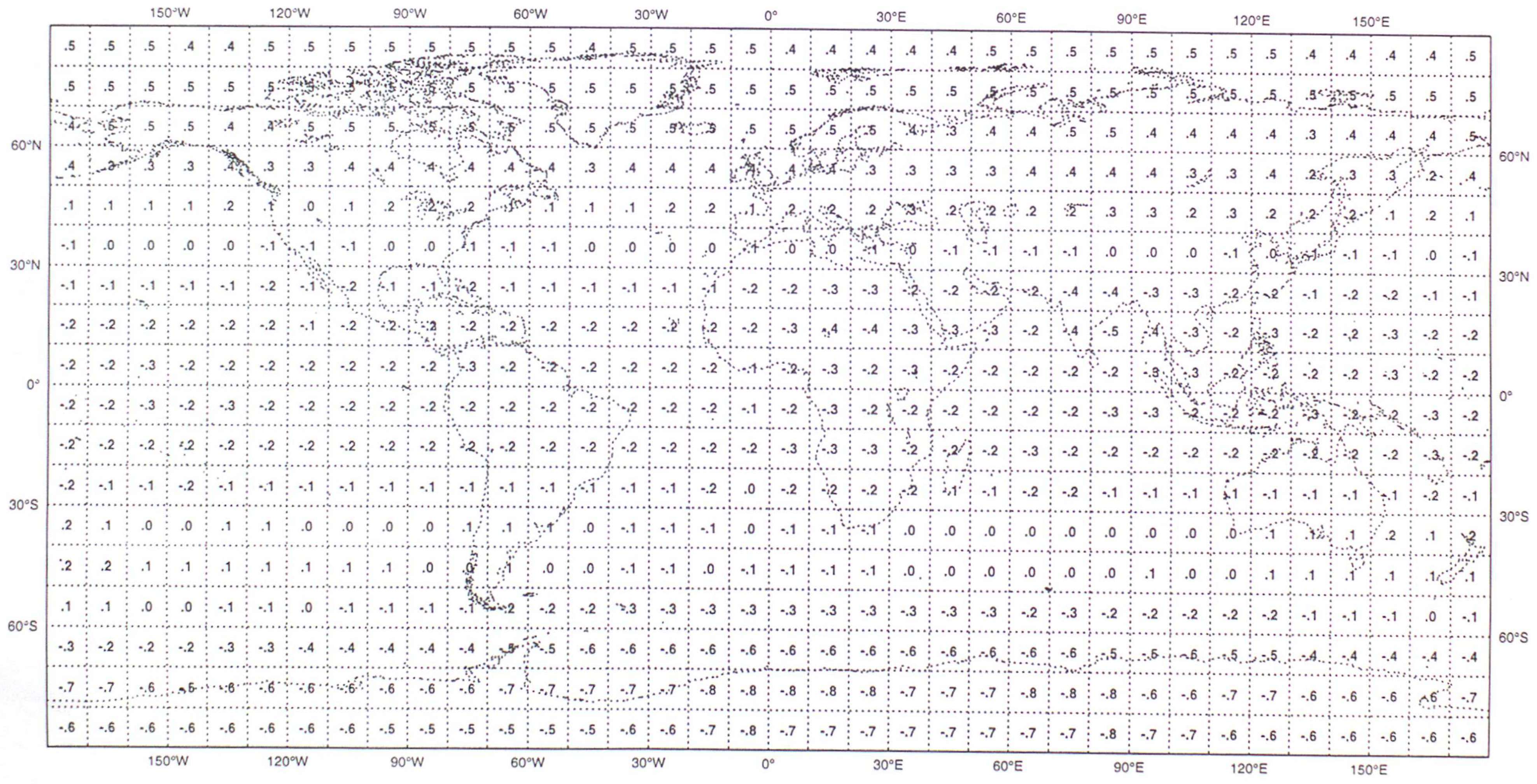

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 52. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA16, using all observations

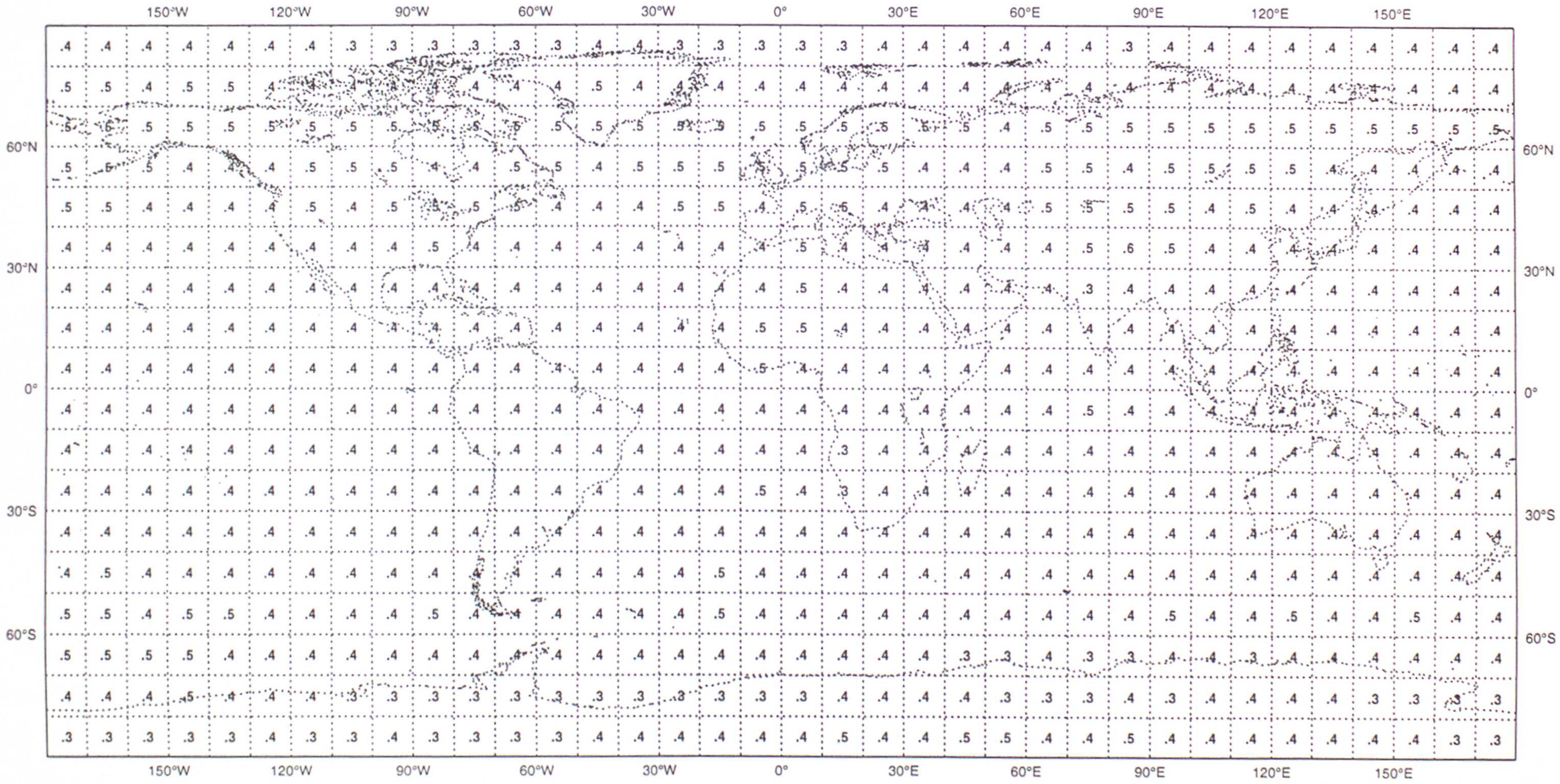

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 53. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

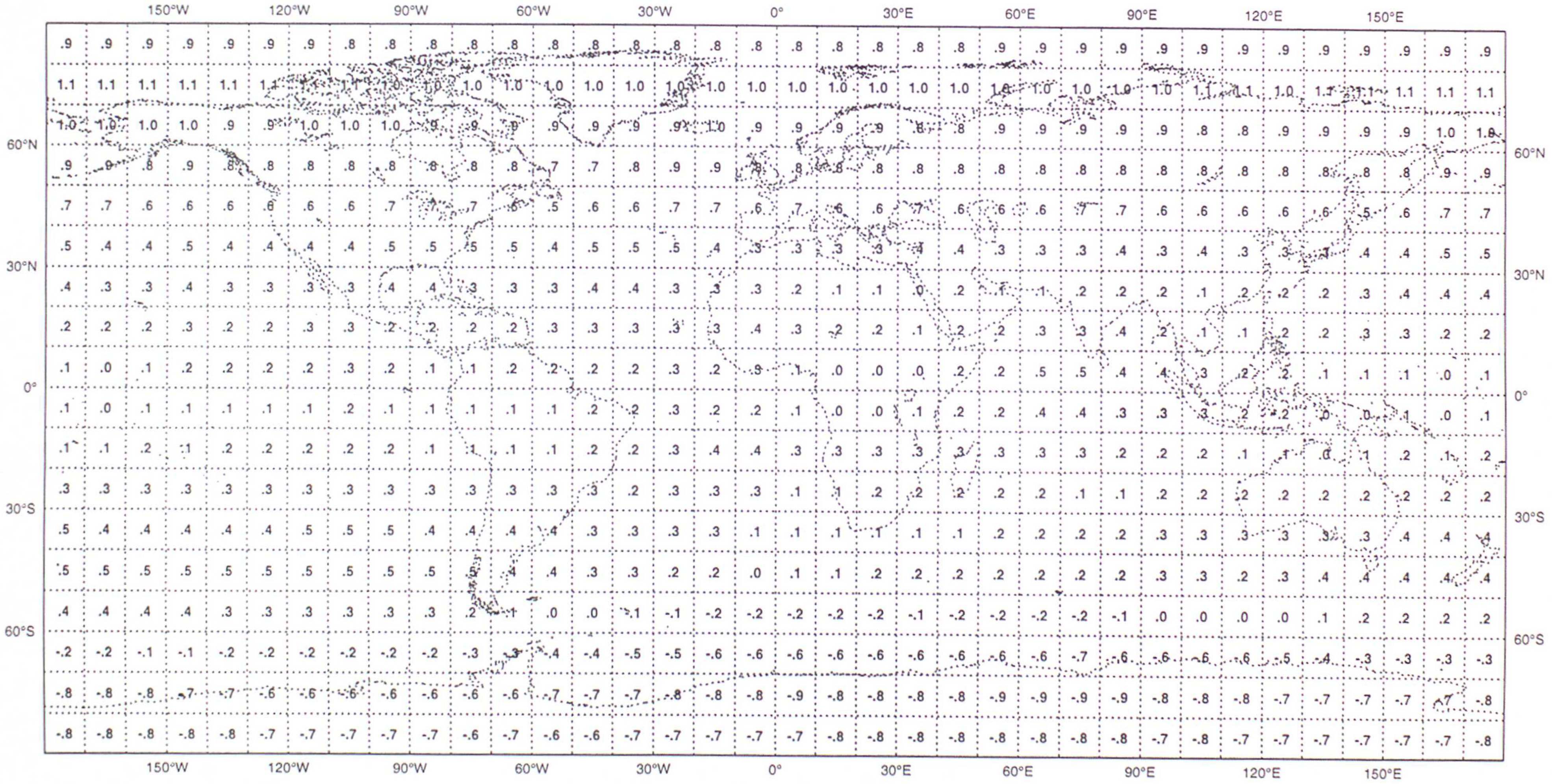

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9
1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.0 1.1 1.1 1.1 1.1 1.1
1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 1.0 .9 .9 .9 .9 .8 .8 .9 .9 .9 .9 .9 .8 .8 .9 .9 .9 .9 1.0 1.0
.9 .9 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .8 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9
.7 .7 .6 .6 .6 .6 .6 .6 .7 .7 .7 .6 .5 .6 .6 .7 .7 .6 .7 .6 .6 .7 .6 .6 .6 .7 .7 .6 .6 .6 .6 .6 .5 .6 .7 .7
.5 .4 .4 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .5 .5 .5 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .3 .4 .3 .3 .3 .4 .4 .5 .5
.4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .4 .3 .3 .3 .2 .1 .1 .0 .2 .1 .1 .2 .2 .2 .1 .2 .2 .2 .3 .4 .4 .4
.2 .2 .2 .3 .2 .2 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .3 .4 .3 .2 .2 .1 .2 .2 .3 .3 .4 .2 .1 .1 .2 .2 .3 .3 .2 .2
.1 .0 .1 .2 .2 .2 .2 .3 .2 .1 .1 .2 .2 .2 .2 .3 .2 .3 .1 .0 .0 .0 .2 .2 .5 .5 .4 .4 .3 .2 .2 .1 .1 .1 .0 .1
.1 .0 .1 .1 .1 .1 .1 .2 .1 .1 .1 .1 .1 .2 .2 .3 .2 .2 .1 .0 .0 .1 .2 .2 .4 .4 .3 .3 .3 .2 .2 .0 .0 .1 .0 .1
.1 .1 .2 .1 .2 .2 .2 .2 .2 .1 .1 .1 .1 .2 .2 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .1 .1 .0 .1 .2 .1 .2
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .1 .1 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .2
.5 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .3 .3 .3 .3 .1 .1 .1 .1 .1 .1 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .3 .3 .2 .2 .0 .1 .1 .2 .2 .2 .2 .2 .2 .2 .3 .3 .2 .3 .4 .4 .4 .4 .4
.4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .2 -.1 .0 .0 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.1 .0 .0 .0 .0 .1 .2 .2 .2 .2
-.2 -.2 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.4 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.6 -.6 -.6 -.6 -.5 -.4 -.3 -.3 -.3 -.3
-.8 -.8 -.8 -.7 -.7 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.8 -.8 -.8 -.9 -.8 -.8 -.8 -.8 -.9 -.9 -.9 -.9 -.8 -.8 -.8 -.7 -.7 -.7 -.7 -.7 -.8
-.8 -.8 -.8 -.8 -.8 -.7 -.7 -.7 -.7 -.7 -.6 -.7 -.6 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.7 -.8 -.7 -.7 -.7 -.7 -.7 -.7 -.8

Figure 54. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA16, using all observations

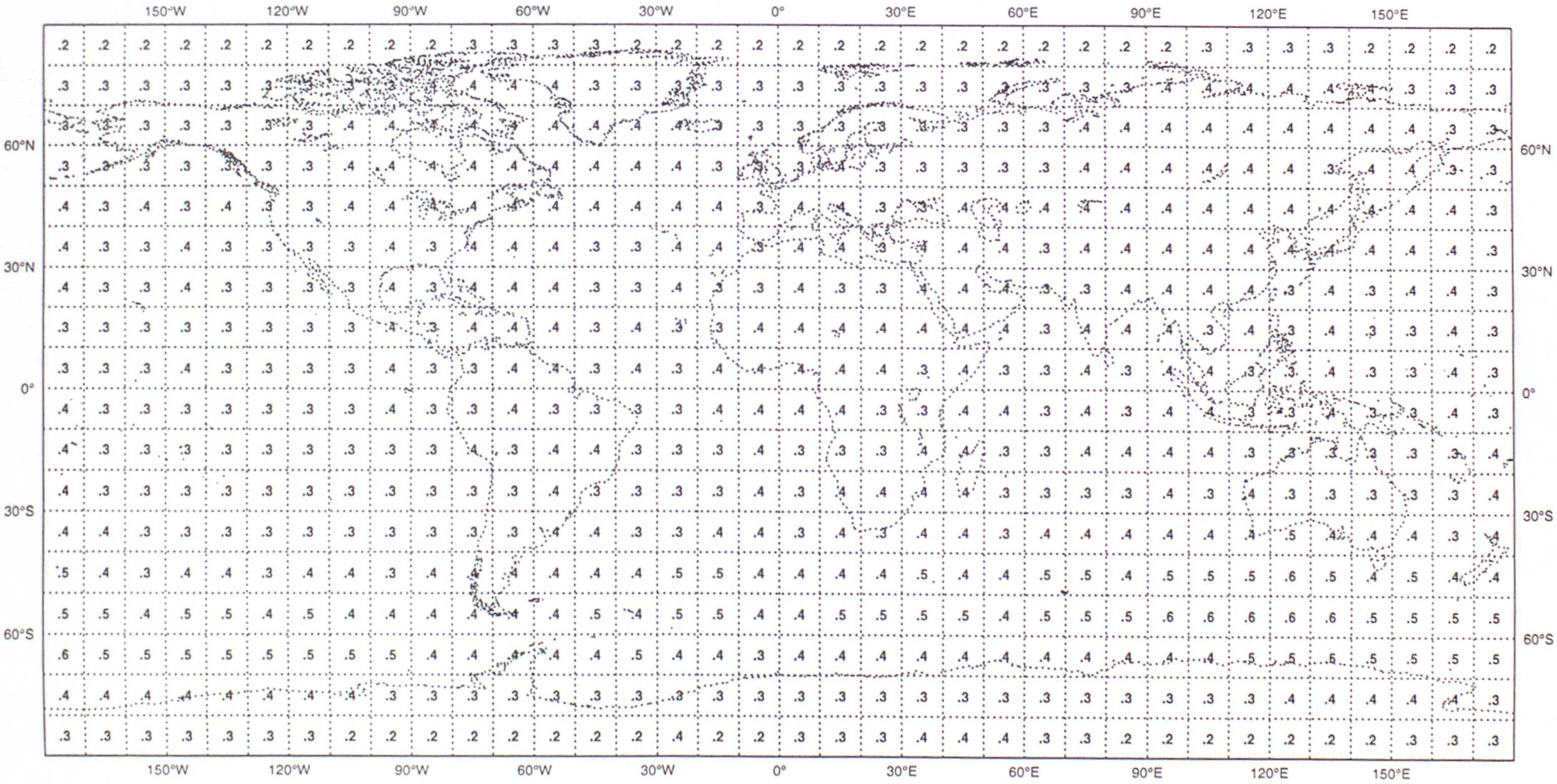
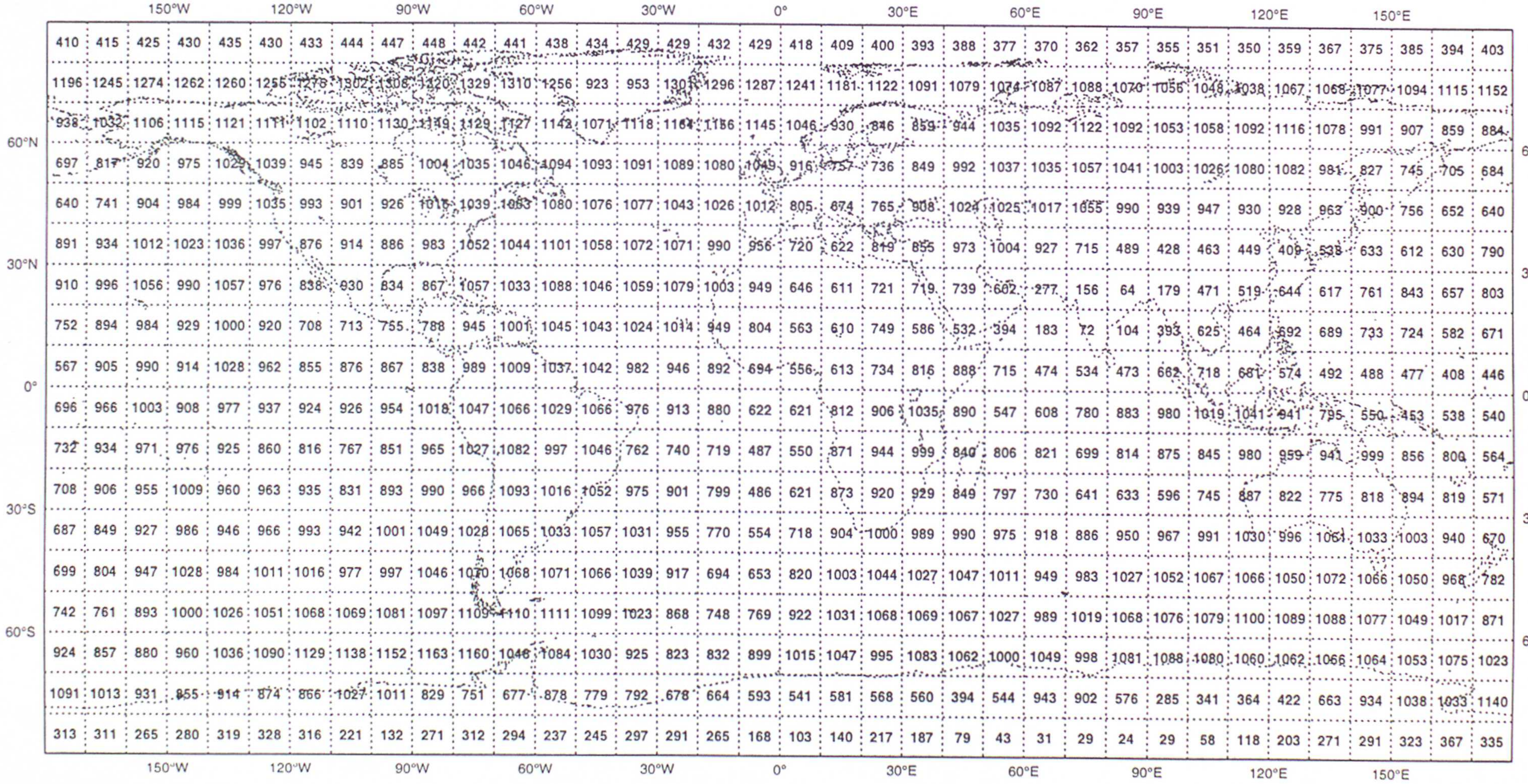
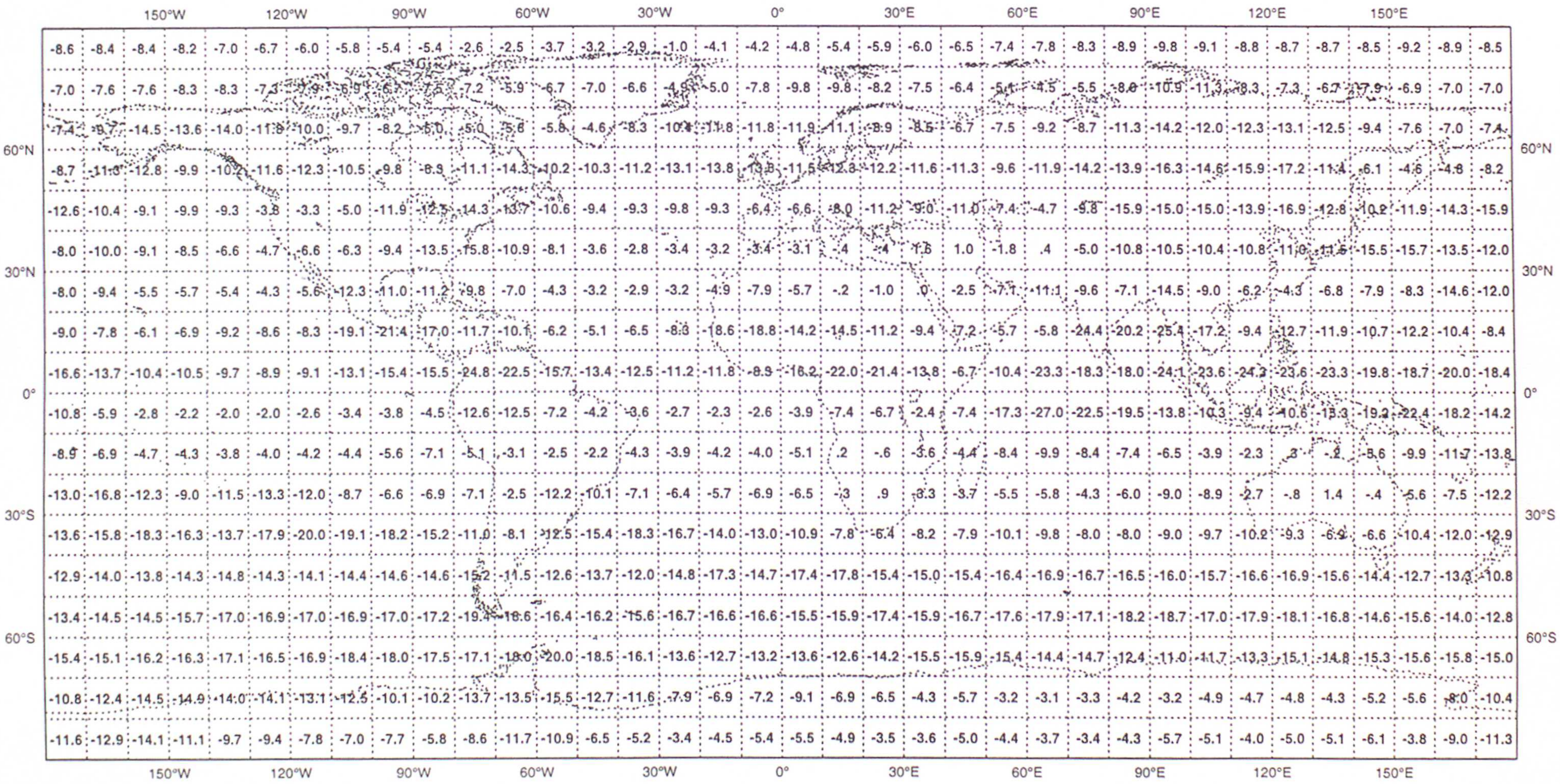

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
.2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3 .3 .2 .2 .2 .2
.3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .3 .3
.3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3
.3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .4 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .3
.4 .3 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.4 .3 .3 .4 .3 .3 .3 .3 .4 .3 .4 .4 .4 .3 .3 .4 .4 .3 .4 .4 .3 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3
.4 .3 .3 .4 .3 .3 .3 .3 .4 .3 .4 .4 .4 .3 .3 .4 .3 .3 .4 .3 .3 .4 .4 .4 .3 .3 .4 .4 .4 .4 .3 .4 .3 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .4 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .3 .4 .3 .4 .3 .3 .4 .3
.3 .3 .3 .4 .3 .3 .3 .3 .4 .3 .3 .4 .4 .3 .4 .3 .4 .4 .4 .4 .4 .3 .4 .3 .3 .4 .3 .4 .4 .3 .3 .4 .3 .3 .4 .3
.4 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .4 .4 .3 .4 .3 .4 .4 .3 .3 .4 .3 .3 .4 .3
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .4 .4 .3 .3 .3 .4 .3 .3 .3 .4 .4 .3 .3 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .4
.4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .3 .3 .3 .3 .4 .3 .4 .4 .4 .4 .3 .3 .3 .3 .4 .3 .4 .3 .3 .3 .3 .3 .4
.4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .3 .3 .4 .4 .3 .4 .3 .4 .4 .3 .4 .4 .4 .4 .4 .4 .5 .4 .4 .4 .3 .4
.5 .4 .3 .4 .4 .3 .4 .4 .3 .4 .4 .4 .4 .4 .4 .5 .5 .4 .4 .4 .4 .5 .4 .4 .5 .5 .4 .5 .5 .5 .6 .5 .4 .5 .4 .4
.5 .5 .4 .5 .5 .4 .5 .4 .4 .4 .4 .4 .4 .5 .4 .5 .5 .4 .4 .5 .5 .5 .5 .4 .5 .5 .5 .6 .6 .6 .6 .6 .5 .5 .5 .5
.6 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .4 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5
.4 .4 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .4 .4 .4 .3
.3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .2 .2 .2 .2 .2 .4 .2 .2 .3 .3 .3 .4 .4 .4 .3 .3 .2 .2 .2 .2 .2 .2 .2 .3 .3 .3

Figure 55. ATOVS mean daily count. JULY 2003
NOAA17, using all observations
Global average number of observations in 24 hours = 542155



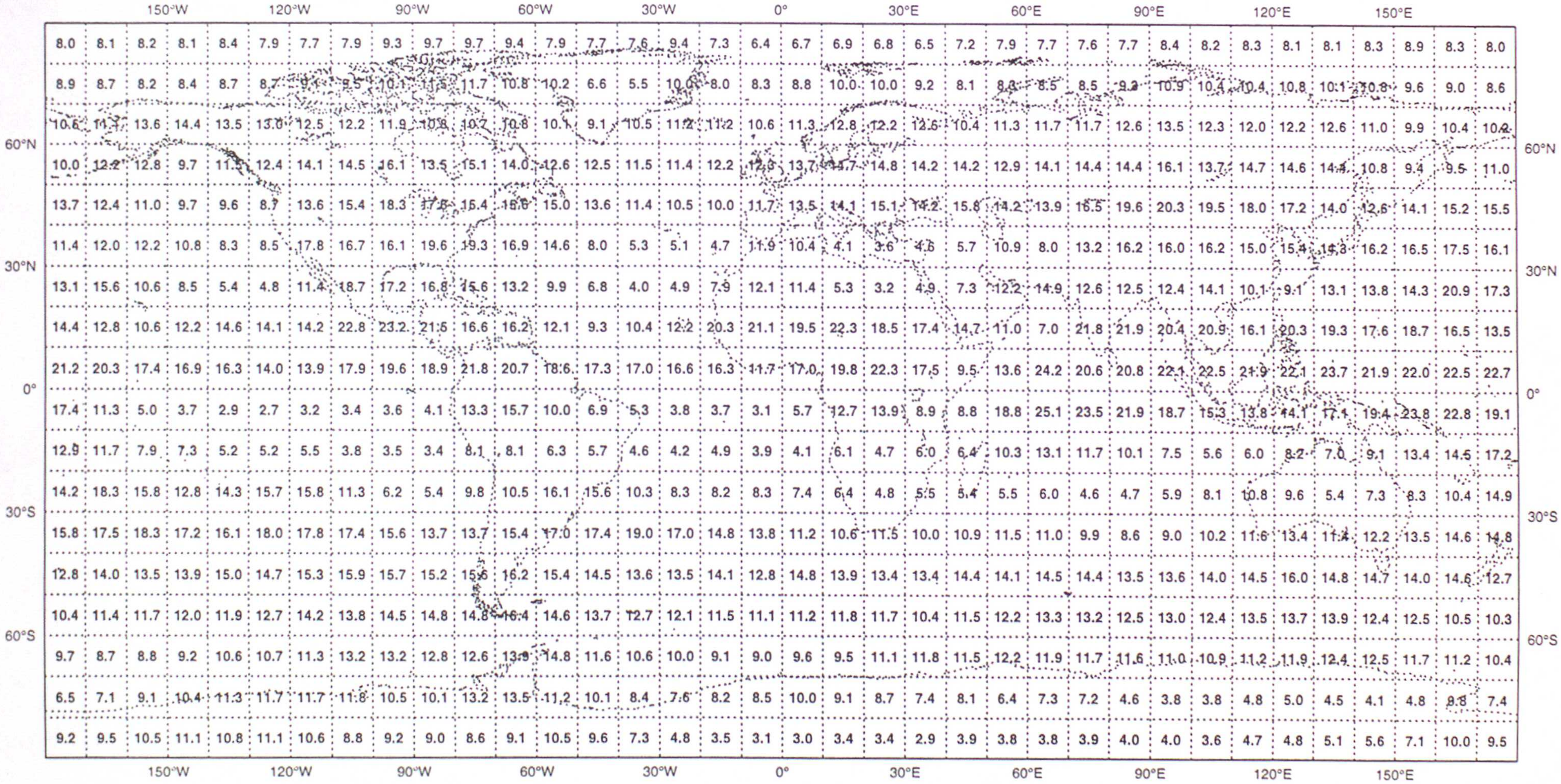
410	415	425	430	435	430	433	444	447	448	442	441	438	434	429	429	432	429	418	409	400	393	388	377	370	362	357	355	351	350	359	367	375	385	394	403
1196	1245	1274	1262	1260	1255	1278	1302	1308	1320	1329	1310	1256	923	953	1301	1296	1287	1241	1181	1122	1091	1079	1074	1087	1088	1070	1056	1048	1038	1067	1068	1077	1094	1115	1152
938	1032	1106	1115	1121	1111	1102	1110	1130	1149	1129	1127	1142	1071	1118	1164	1156	1145	1046	930	846	859	944	1035	1092	1122	1092	1053	1058	1092	1116	1078	991	907	859	884
697	817	920	975	1029	1039	945	839	885	1004	1035	1046	1094	1093	1091	1089	1080	1049	916	757	736	849	992	1037	1035	1057	1041	1003	1026	1080	1082	981	827	745	705	684
640	741	904	984	999	1035	993	901	926	1016	1039	1063	1080	1076	1077	1043	1026	1012	805	674	765	908	1024	1025	1017	1055	990	939	947	930	928	963	900	756	652	640
891	934	1012	1023	1036	997	876	914	886	983	1052	1044	1101	1058	1072	1071	990	956	720	622	819	855	973	1004	927	715	489	428	463	449	409	538	633	612	630	790
910	996	1056	990	1057	976	838	930	834	867	1057	1033	1088	1046	1059	1079	1003	949	646	611	721	719	739	602	277	156	64	179	471	519	644	617	761	843	657	803
752	894	984	929	1000	920	708	713	755	788	945	1001	1045	1043	1024	1014	949	804	563	610	749	586	532	394	183	72	104	393	625	464	692	689	733	724	582	671
567	905	990	914	1028	962	855	876	867	838	989	1009	1037	1042	982	946	892	694	556	613	734	816	888	715	474	534	473	662	718	681	574	492	488	477	408	446
696	966	1003	908	977	937	924	926	954	1018	1047	1066	1029	1066	976	913	880	622	621	812	906	1035	890	547	608	780	883	980	1019	1041	941	795	550	453	538	540
732	934	971	976	925	860	816	767	851	965	1027	1082	997	1046	762	740	719	487	550	871	944	999	840	806	821	699	814	875	845	980	959	941	999	856	800	564
708	906	955	1009	960	963	935	831	893	990	966	1093	1016	1052	975	901	799	486	621	873	920	929	849	797	730	641	633	596	745	887	822	775	818	894	819	571
687	849	927	986	946	966	993	942	1001	1049	1028	1065	1033	1057	1031	955	770	554	718	904	1000	989	990	975	918	886	950	967	991	1030	996	1061	1033	1003	940	670
699	804	947	1028	984	1011	1016	977	997	1046	1070	1068	1071	1066	1039	917	694	653	820	1003	1044	1027	1047	1011	949	983	1027	1052	1067	1066	1050	1072	1066	1050	968	782
742	761	893	1000	1026	1051	1068	1069	1081	1097	1109	1110	1111	1099	1023	868	748	769	922	1031	1068	1069	1067	1027	989	1019	1068	1076	1079	1100	1089	1088	1077	1049	1017	871
924	857	880	960	1036	1090	1129	1138	1152	1163	1160	1046	1084	1030	925	823	832	899	1015	1047	995	1083	1062	1000	1049	998	1081	1088	1080	1060	1062	1066	1064	1053	1075	1023
1091	1013	931	855	914	874	866	1027	1011	829	751	677	878	779	792	678	664	593	541	581	568	560	394	544	943	902	576	285	341	364	422	663	934	1038	1033	1140
313	311	265	280	319	328	316	221	132	271	312	294	237	245	297	291	265	168	103	140	217	187	79	43	31	29	24	29	58	118	203	271	291	323	367	335

Figure 56. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



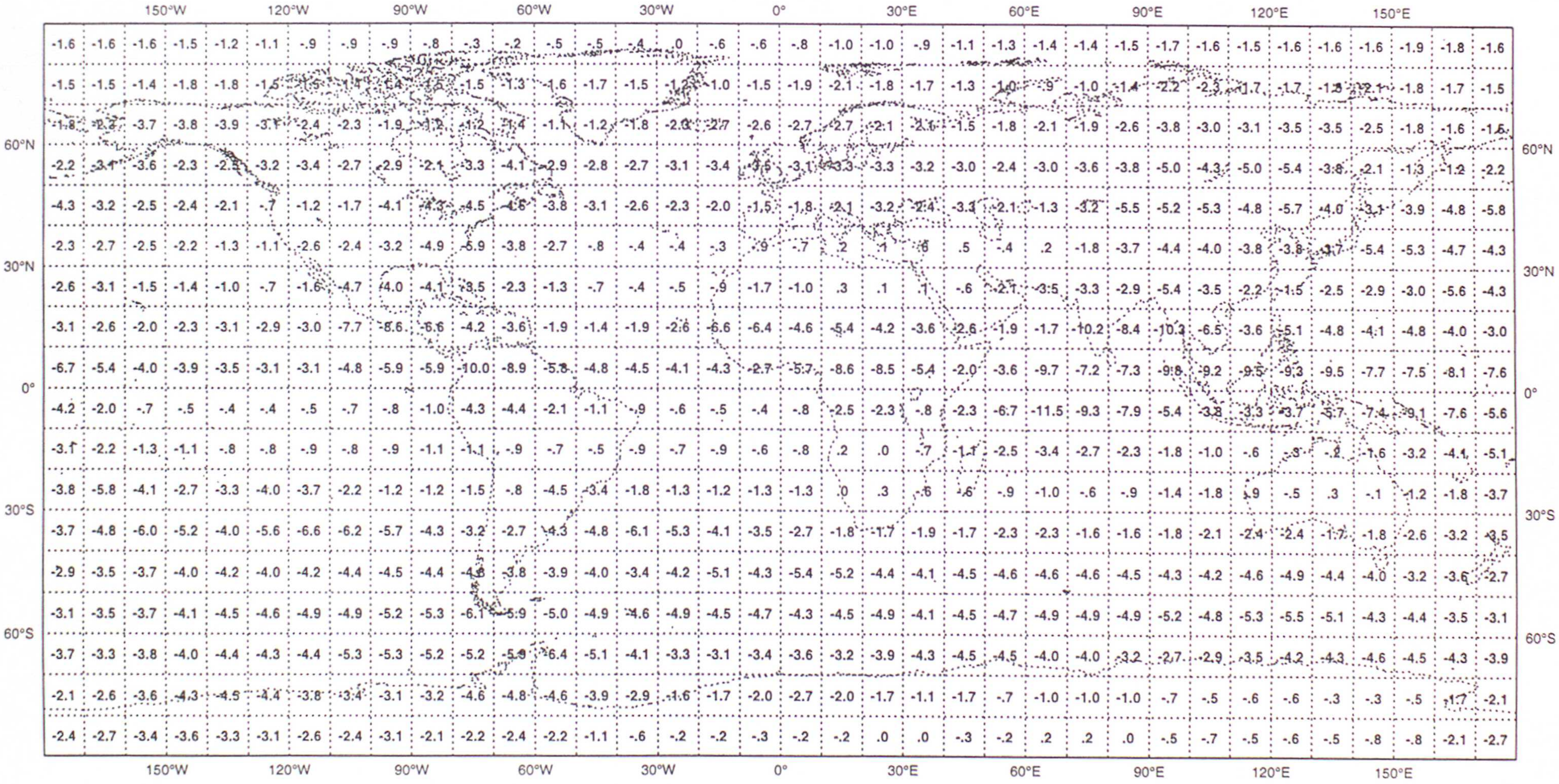
-8.6	-8.4	-8.4	-8.2	-7.0	-6.7	-6.0	-5.8	-5.4	-5.4	-2.6	-2.5	-3.7	-3.2	-2.9	-1.0	-4.1	-4.2	-4.8	-5.4	-5.9	-6.0	-6.5	-7.4	-7.8	-8.3	-8.9	-9.8	-9.1	-8.8	-8.7	-8.7	-8.5	-9.2	-8.9	-8.5
-7.0	-7.6	-7.6	-8.3	-8.3	-7.3	-7.9	-6.9	-6.7	-7.5	-7.2	-5.9	-6.7	-7.0	-6.6	-4.9	-5.0	-7.8	-9.8	-9.8	-8.2	-7.5	-6.4	-5.1	-4.5	-5.5	-8.0	-10.9	-11.3	-8.3	-7.3	-6.7	-7.9	-6.9	-7.0	-7.0
-7.4	-9.7	-14.5	-13.6	-14.0	-11.8	-10.0	-9.7	-8.2	-5.0	-5.0	-5.6	-5.8	-4.6	-8.3	-10.4	-11.8	-11.8	-11.9	-11.1	-8.9	-8.5	-6.7	-7.5	-9.2	-8.7	-11.3	-14.2	-12.0	-12.3	-13.1	-12.5	-9.4	-7.6	-7.0	-7.4
-8.7	-11.3	-12.8	-9.9	-10.2	-11.6	-12.3	-10.5	-9.8	-8.9	-11.1	-14.3	-10.2	-10.3	-11.2	-13.1	-13.8	-13.8	-11.5	-12.8	-12.2	-11.6	-11.3	-9.6	-11.9	-14.2	-13.9	-16.3	-14.6	-15.9	-17.2	-11.4	-6.1	-4.6	-4.8	-8.2
-12.6	-10.4	-9.1	-9.9	-9.3	-3.8	-3.3	-5.0	-11.9	-12.5	-14.3	-13.7	-10.6	-9.4	-9.3	-9.8	-9.3	-6.4	-6.6	-8.0	-11.2	-9.0	-11.0	-7.4	-4.7	-9.8	-15.9	-15.0	-15.0	-13.9	-16.9	-12.8	-10.2	-11.9	-14.3	-15.9
-8.0	-10.0	-9.1	-8.5	-6.6	-4.7	-6.6	-6.3	-9.4	-13.5	-15.8	-10.9	-8.1	-3.6	-2.8	-3.4	-3.2	-3.4	-3.1	-.4	-.4	1.6	1.0	-1.8	.4	-5.0	-10.8	-10.5	-10.4	-10.8	-11.0	-11.5	-15.5	-15.7	-13.5	-12.0
-8.0	-9.4	-5.5	-5.7	-5.4	-4.3	-5.6	-12.3	-11.0	-11.2	-9.8	-7.0	-4.3	-3.2	-2.9	-3.2	-4.9	-7.9	-5.7	-.2	-1.0	.0	-2.5	-7.1	-11.1	-9.6	-7.1	-14.5	-9.0	-6.2	-4.3	-6.8	-7.9	-8.3	-14.6	-12.0
-9.0	-7.8	-6.1	-6.9	-9.2	-8.6	-8.3	-19.1	-21.4	-17.0	-11.7	-10.1	-6.2	-5.1	-6.5	-8.3	-18.6	-18.8	-14.2	-14.5	-11.2	-9.4	-7.2	-5.7	-5.8	-24.4	-20.2	-25.4	-17.2	-9.4	-12.7	-11.9	-10.7	-12.2	-10.4	-8.4
-16.6	-13.7	-10.4	-10.5	-9.7	-8.9	-9.1	-13.1	-15.4	-15.5	-24.8	-22.5	-15.7	-13.4	-12.5	-11.2	-11.8	-8.9	-16.2	-22.0	-21.4	-13.8	-6.7	-10.4	-23.3	-18.3	-18.0	-24.1	-23.6	-24.3	-23.6	-23.3	-19.8	-18.7	-20.0	-18.4
-10.8	-5.9	-2.8	-2.2	-2.0	-2.0	-2.6	-3.4	-3.8	-4.5	-12.6	-12.5	-7.2	-4.2	-3.6	-2.7	-2.3	-2.6	-3.9	-7.4	-6.7	-2.4	-7.4	-17.3	-27.0	-22.5	-19.5	-13.8	-10.3	-9.4	-10.6	-13.3	-19.2	-22.4	-18.2	-14.2
-8.9	-6.9	-4.7	-4.3	-3.8	-4.0	-4.2	-4.4	-5.6	-7.1	-5.1	-3.1	-2.5	-2.2	-4.3	-3.9	-4.2	-4.0	-5.1	.2	-.6	-3.6	-4.4	-8.4	-9.9	-8.4	-7.4	-6.5	-3.9	-2.3	.3	-.2	-5.6	-9.9	-11.7	-13.8
-13.0	-16.8	-12.3	-9.0	-11.5	-13.3	-12.0	-8.7	-6.6	-6.9	-7.1	-2.5	-12.2	-10.1	-7.1	-6.4	-5.7	-6.9	-6.5	-.3	.9	-3.3	-3.7	-5.5	-5.8	-4.3	-6.0	-9.0	-8.9	-2.7	-.8	1.4	-.4	-5.6	-7.5	-12.2
-13.6	-15.8	-18.3	-16.3	-13.7	-17.9	-20.0	-19.1	-18.2	-15.2	-11.0	-8.1	-12.5	-15.4	-18.3	-16.7	-14.0	-13.0	-10.9	-7.8	-6.4	-8.2	-7.9	-10.1	-9.8	-8.0	-8.0	-9.0	-9.7	-10.2	-9.3	-6.9	-6.6	-10.4	-12.0	-12.9
-12.9	-14.0	-13.8	-14.3	-14.8	-14.3	-14.1	-14.4	-14.6	-14.6	-15.2	-11.5	-12.6	-13.7	-12.0	-14.8	-17.3	-14.7	-17.4	-17.8	-15.4	-15.0	-15.4	-16.4	-16.9	-16.7	-16.5	-16.0	-15.7	-16.6	-16.9	-15.6	-14.4	-12.7	-13.3	-10.8
-13.4	-14.5	-14.5	-15.7	-17.0	-16.9	-17.0	-16.9	-17.0	-17.2	-19.4	-18.6	-16.4	-16.2	-15.6	-16.7	-16.6	-16.6	-15.5	-15.9	-17.4	-15.9	-16.7	-17.6	-17.9	-17.1	-18.2	-18.7	-17.0	-17.9	-18.1	-16.8	-14.6	-15.6	-14.0	-12.8
-15.4	-15.1	-16.2	-16.3	-17.1	-16.5	-16.9	-18.4	-18.0	-17.5	-17.1	-18.0	-20.0	-18.5	-16.1	-13.6	-12.7	-13.2	-13.6	-12.6	-14.2	-15.5	-15.9	-15.4	-14.4	-14.7	-12.4	-11.0	-11.7	-13.3	-15.1	-14.8	-15.3	-15.6	-15.8	-15.0
-10.8	-12.4	-14.5	-14.9	-14.0	-14.1	-13.1	-12.5	-10.1	-10.2	-13.7	-13.5	-15.5	-12.7	-11.6	-7.9	-6.9	-7.2	-9.1	-6.9	-6.5	-4.3	-5.7	-3.2	-3.1	-3.3	-4.2	-3.2	-4.9	-4.7	-4.8	-4.3	-5.2	-5.6	-8.0	-10.4
-11.6	-12.9	-14.1	-11.1	-9.7	-9.4	-7.8	-7.0	-7.7	-5.8	-8.6	-11.7	-10.9	-6.5	-5.2	-3.4	-4.5	-5.4	-5.5	-4.9	-3.5	-3.6	-5.0	-4.4	-3.7	-3.4	-4.3	-5.7	-5.1	-4.0	-5.0	-5.1	-6.1	-3.8	-9.0	-11.3

Figure 57. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS8 (Surface)
NOAA17, using all observations



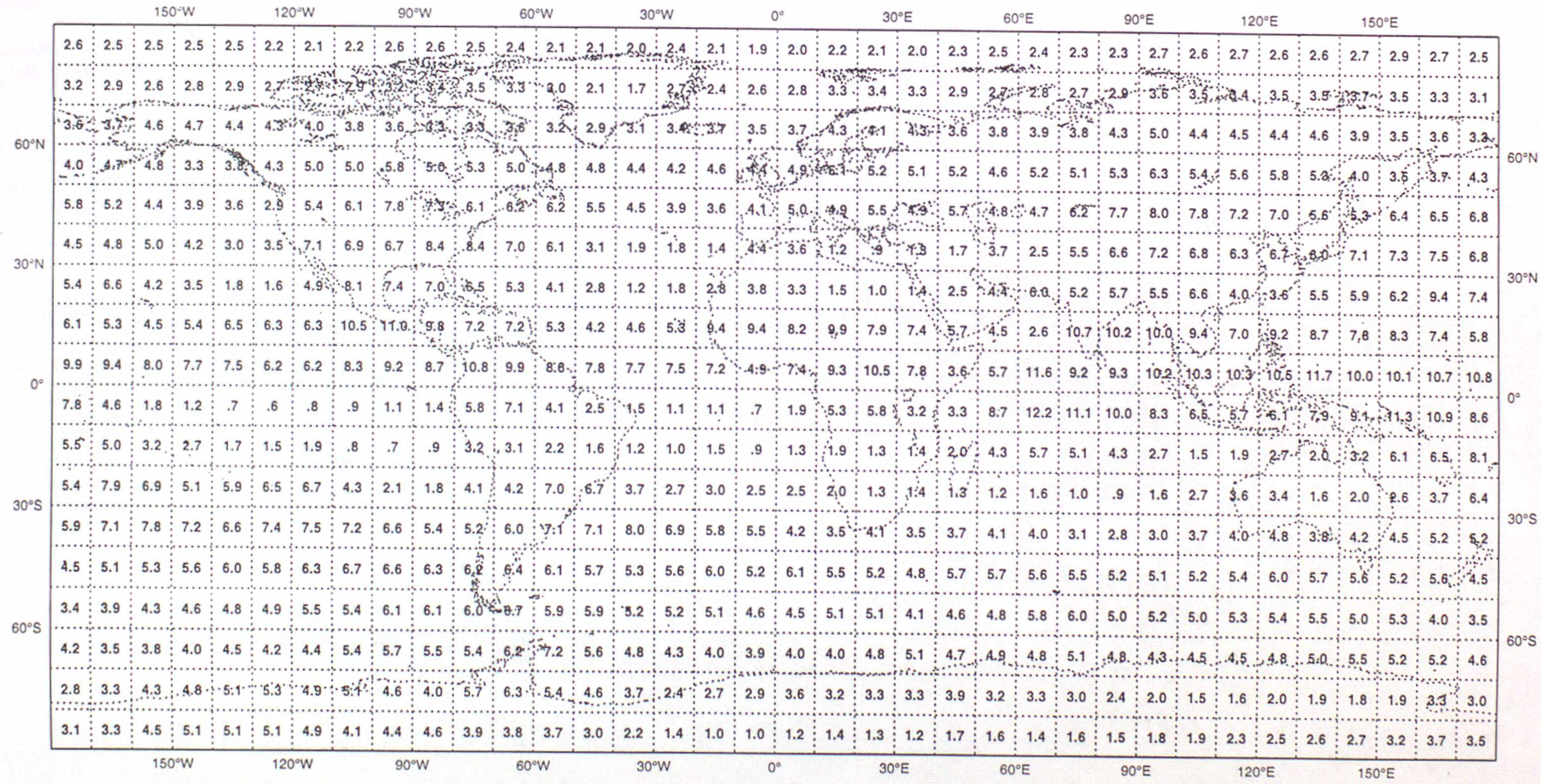
8.0	8.1	8.2	8.1	8.4	7.9	7.7	7.9	9.3	9.7	9.7	9.4	7.9	7.7	7.6	9.4	7.3	6.4	6.7	6.9	6.8	6.5	7.2	7.9	7.7	7.6	7.7	8.4	8.2	8.3	8.1	8.1	8.3	8.9	8.3	8.0
8.9	8.7	8.2	8.4	8.7	8.7	9.1	9.5	10.1	11.5	11.7	10.8	10.2	6.6	5.5	10.0	8.0	8.3	8.8	10.0	10.0	9.2	8.1	8.3	8.5	8.5	9.3	10.9	10.4	10.4	10.8	10.1	10.8	9.6	9.0	8.6
10.6	11.7	13.6	14.4	13.5	13.0	12.5	12.2	11.9	10.8	10.7	10.8	10.1	9.1	10.5	11.2	11.2	10.6	11.3	12.8	12.2	12.6	10.4	11.3	11.7	11.7	12.6	13.5	12.3	12.0	12.2	12.6	11.0	9.9	10.4	10.2
10.0	12.2	12.8	9.7	11.5	12.4	14.1	14.5	16.1	13.5	15.1	14.0	12.6	12.5	11.5	11.4	12.2	12.3	13.7	14.7	14.8	14.2	14.2	12.9	14.1	14.4	14.4	16.1	13.7	14.7	14.6	14.4	10.8	9.4	9.5	11.0
13.7	12.4	11.0	9.7	9.6	8.7	13.6	15.4	18.3	17.8	15.4	15.6	15.0	13.6	11.4	10.5	10.0	11.7	13.5	14.1	15.1	14.2	15.8	14.2	13.9	16.5	19.6	20.3	19.5	18.0	17.2	14.0	12.6	14.1	15.2	15.5
11.4	12.0	12.2	10.8	8.3	8.5	17.8	16.7	16.1	19.6	19.3	16.9	14.6	8.0	5.3	5.1	4.7	11.9	10.4	4.1	3.6	4.6	5.7	10.9	8.0	13.2	16.2	16.0	16.2	15.0	15.4	14.3	16.2	16.5	17.5	16.1
13.1	15.6	10.6	8.5	5.4	4.8	11.4	18.7	17.2	16.8	15.6	13.2	9.9	6.8	4.0	4.9	7.9	12.1	11.4	5.3	3.2	4.9	7.3	12.2	14.9	12.6	12.5	12.4	14.1	10.1	9.1	13.1	13.8	14.3	20.9	17.3
14.4	12.8	10.6	12.2	14.6	14.1	14.2	22.8	23.2	21.5	16.6	16.2	12.1	9.3	10.4	12.2	20.3	21.1	19.5	22.3	18.5	17.4	14.7	11.0	7.0	21.8	21.9	20.4	20.9	16.1	20.3	19.3	17.6	18.7	16.5	13.5
21.2	20.3	17.4	16.9	16.3	14.0	13.9	17.9	19.6	18.9	21.8	20.7	18.6	17.3	17.0	16.6	16.3	11.7	17.0	19.8	22.3	17.5	9.5	13.6	24.2	20.6	20.8	22.1	22.5	21.9	22.1	23.7	21.9	22.0	22.5	22.7
17.4	11.3	5.0	3.7	2.9	2.7	3.2	3.4	3.6	4.1	13.3	15.7	10.0	6.9	5.3	3.8	3.7	3.1	5.7	12.7	13.9	8.9	8.8	18.8	25.1	23.5	21.9	18.7	15.3	13.8	14.1	17.1	19.4	23.8	22.8	19.1
12.9	11.7	7.9	7.3	5.2	5.2	5.5	3.8	3.5	3.4	8.1	8.1	6.3	5.7	4.6	4.2	4.9	3.9	4.1	6.1	4.7	6.0	6.4	10.3	13.1	11.7	10.1	7.5	5.6	6.0	8.2	7.0	9.1	13.4	14.5	17.2
14.2	18.3	15.8	12.8	14.3	15.7	15.8	11.3	6.2	5.4	9.8	10.5	16.1	15.6	10.3	8.3	8.2	8.3	7.4	6.4	4.8	5.5	5.4	5.5	6.0	4.6	4.7	5.9	8.1	10.8	9.6	5.4	7.3	8.3	10.4	14.9
15.8	17.5	18.3	17.2	16.1	18.0	17.8	17.4	15.6	13.7	13.7	15.4	17.0	17.4	19.0	17.0	14.8	13.8	11.2	10.6	11.5	10.0	10.9	11.5	11.0	9.9	8.6	9.0	10.2	11.6	13.4	11.4	12.2	13.5	14.6	14.8
12.8	14.0	13.5	13.9	15.0	14.7	15.3	15.9	15.7	15.2	15.6	16.2	15.4	14.5	13.6	13.5	14.1	12.8	14.8	13.9	13.4	13.4	14.4	14.1	14.5	14.4	13.5	13.6	14.0	14.5	16.0	14.8	14.7	14.0	14.6	12.7
10.4	11.4	11.7	12.0	11.9	12.7	14.2	13.8	14.5	14.8	14.8	16.4	14.6	13.7	12.7	12.1	11.5	11.1	11.2	11.8	11.7	10.4	11.5	12.2	13.3	13.2	12.5	13.0	12.4	13.5	13.7	13.9	12.4	12.5	10.5	10.3
9.7	8.7	8.8	9.2	10.6	10.7	11.3	13.2	13.2	12.8	12.6	13.9	14.8	11.6	10.6	10.0	9.1	9.0	9.6	9.5	11.1	11.8	11.5	12.2	11.9	11.7	11.6	11.0	10.9	11.2	11.9	12.4	12.5	11.7	11.2	10.4
6.5	7.1	9.1	10.4	11.3	11.7	11.7	11.8	10.5	10.1	13.2	13.5	11.2	10.1	8.4	7.6	8.2	8.5	10.0	9.1	8.7	7.4	8.1	6.4	7.3	7.2	4.6	3.8	3.8	4.8	5.0	4.5	4.1	4.8	8.8	7.4
9.2	9.5	10.5	11.1	10.8	11.1	10.6	8.8	9.2	9.0	8.6	9.1	10.5	9.6	7.3	4.8	3.5	3.1	3.0	3.4	3.4	2.9	3.9	3.8	3.8	3.9	4.0	4.0	3.6	4.7	4.8	5.1	5.6	7.1	10.0	9.5

Figure 58. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



-1.6	-1.6	-1.6	-1.5	-1.2	-1.1	-.9	-.9	-.9	-.8	-.3	-.2	-.5	-.5	-.4	.0	-.6	-.6	-.8	-1.0	-1.0	-.9	-1.1	-1.3	-1.4	-1.4	-1.5	-1.7	-1.6	-1.5	-1.6	-1.6	-1.6	-1.9	-1.8	-1.6
-1.5	-1.5	-1.4	-1.8	-1.8	-1.5	-1.5	-1.4	-1.4	-1.5	-1.5	-1.3	-1.6	-1.7	-1.5	-1.2	-1.0	-1.5	-1.9	-2.1	-1.8	-1.7	-1.3	-1.0	-.9	-1.0	-1.4	-2.2	-2.3	-1.7	-1.7	-1.3	-2.1	-1.8	-1.7	-1.5
-1.8	-2.2	-3.7	-3.8	-3.9	-3.1	-2.4	-2.3	-1.9	-1.2	-1.2	-1.4	-1.1	-1.2	-1.8	-2.0	-2.7	-2.6	-2.7	-2.7	-2.1	-2.1	-1.5	-1.8	-2.1	-1.9	-2.6	-3.8	-3.0	-3.1	-3.5	-3.5	-2.5	-1.8	-1.6	-1.6
-2.2	-3.1	-3.6	-2.3	-2.5	-3.2	-3.4	-2.7	-2.9	-2.1	-3.3	-4.1	-2.9	-2.8	-2.7	-3.1	-3.4	-3.5	-3.1	-3.3	-3.3	-3.2	-3.0	-2.4	-3.0	-3.6	-3.8	-5.0	-4.3	-5.0	-5.4	-3.8	-2.1	-1.3	-1.2	-2.2
-4.3	-3.2	-2.5	-2.4	-2.1	-.7	-1.2	-1.7	-4.1	-4.3	-4.5	-4.6	-3.8	-3.1	-2.6	-2.3	-2.0	-1.5	-1.8	-2.1	-3.2	-2.4	-3.3	-2.1	-1.3	-3.2	-5.5	-5.2	-5.3	-4.8	-5.7	-4.0	-3.1	-3.9	-4.8	-5.8
-2.3	-2.7	-2.5	-2.2	-1.3	-1.1	-2.6	-2.4	-3.2	-4.9	-5.9	-3.8	-2.7	-.8	-.4	-.4	-.3	-.9	-.7	.2	.1	.6	.5	-.4	.2	-1.8	-3.7	-4.4	-4.0	-3.8	-3.8	-3.7	-5.4	-5.3	-4.7	-4.3
-2.6	-3.1	-1.5	-1.4	-1.0	-.7	-1.6	-4.7	-4.0	-4.1	-3.5	-2.3	-1.3	-.7	-.4	-.5	-.9	-1.7	-1.0	.3	.1	.1	-.6	-2.1	-3.5	-3.3	-2.9	-5.4	-3.5	-2.2	-1.5	-2.5	-2.9	-3.0	-5.6	-4.3
-3.1	-2.6	-2.0	-2.3	-3.1	-2.9	-3.0	-7.7	-8.6	-6.6	-4.2	-3.6	-1.9	-1.4	-1.9	-2.6	-6.6	-6.4	-4.6	-5.4	-4.2	-3.6	-2.6	-1.9	-1.7	-10.2	-8.4	-10.3	-6.5	-3.6	-5.1	-4.8	-4.1	-4.8	-4.0	-3.0
-6.7	-5.4	-4.0	-3.9	-3.5	-3.1	-3.1	-4.8	-5.9	-5.9	-10.0	-8.9	-5.8	-4.8	-4.5	-4.1	-4.3	-2.7	-5.7	-8.6	-8.5	-5.4	-2.0	-3.6	-9.7	-7.2	-7.3	-9.8	-9.2	-9.5	-9.3	-9.5	-7.7	-7.5	-8.1	-7.6
-4.2	-2.0	-.7	-.5	-.4	-.4	-.5	-.7	-.8	-1.0	-4.3	-4.4	-2.1	-1.1	-.9	-.6	-.5	-.4	-.8	-2.5	-2.3	-.8	-2.3	-6.7	-11.5	-9.3	-7.9	-5.4	-3.8	-3.3	-3.7	-5.7	-7.4	-9.1	-7.6	-5.6
-3.1	-2.2	-1.3	-1.1	-.8	-.8	-.9	-.8	-.9	-1.1	-1.1	-.9	-.7	-.5	-.9	-.7	-.9	-.6	-.8	.2	.0	-.7	-1.1	-2.5	-3.4	-2.7	-2.3	-1.8	-1.0	-.6	-.3	-.2	-1.6	-3.2	-4.1	-5.1
-3.8	-5.8	-4.1	-2.7	-3.3	-4.0	-3.7	-2.2	-1.2	-1.2	-1.5	-.8	-4.5	-3.4	-1.8	-1.3	-1.2	-1.3	-1.3	.0	.3	-.6	-.6	-.9	-1.0	-.6	-.9	-1.4	-1.8	.9	-.5	.3	-.1	-1.2	-1.8	-3.7
-3.7	-4.8	-6.0	-5.2	-4.0	-5.6	-6.6	-6.2	-5.7	-4.3	-3.2	-2.7	-4.3	-4.8	-6.1	-5.3	-4.1	-3.5	-2.7	-1.8	-1.7	-1.9	-1.7	-2.3	-2.3	-1.6	-1.6	-1.8	-2.1	-2.4	-2.4	-1.7	-1.8	-2.6	-3.2	-3.5
-2.9	-3.5	-3.7	-4.0	-4.2	-4.0	-4.2	-4.4	-4.5	-4.4	-4.8	-3.8	-3.9	-4.0	-3.4	-4.2	-5.1	-4.3	-5.4	-5.2	-4.4	-4.1	-4.5	-4.6	-4.6	-4.6	-4.5	-4.3	-4.2	-4.6	-4.9	-4.4	-4.0	-3.2	-3.6	-2.7
-3.1	-3.5	-3.7	-4.1	-4.5	-4.6	-4.9	-4.9	-5.2	-5.3	-6.1	-5.9	-5.0	-4.9	-4.6	-4.9	-4.5	-4.7	-4.3	-4.5	-4.9	-4.1	-4.5	-4.7	-4.9	-4.9	-4.9	-5.2	-4.8	-5.3	-5.5	-5.1	-4.3	-4.4	-3.5	-3.1
-3.7	-3.3	-3.8	-4.0	-4.4	-4.3	-4.4	-5.3	-5.3	-5.2	-5.2	-5.9	-6.4	-5.1	-4.1	-3.3	-3.1	-3.4	-3.6	-3.2	-3.9	-4.3	-4.5	-4.5	-4.0	-4.0	-3.2	-2.7	-2.9	-3.5	-4.2	-4.3	-4.6	-4.5	-4.3	-3.9
-2.1	-2.6	-3.6	-4.3	-4.5	-4.4	-3.8	-3.4	-3.1	-3.2	-4.6	-4.8	-4.6	-3.9	-2.9	-1.6	-1.7	-2.0	-2.7	-2.0	-1.7	-1.1	-1.7	-.7	-1.0	-1.0	-1.0	-.7	-.5	-.6	-.6	-.3	-.3	-.5	-1.7	-2.1
-2.4	-2.7	-3.4	-3.6	-3.3	-3.1	-2.6	-2.4	-3.1	-2.1	-2.2	-2.4	-2.2	-1.1	-.6	-.2	-.2	-.3	-.2	-.2	.0	.0	-.3	-.2	.2	.2	.0	-.5	-.7	-.5	-.6	-.5	-.8	-.8	-2.1	-2.7

Figure 59. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS15 (700 hPa)
NOAA17, using all observations



2.6	2.5	2.5	2.5	2.5	2.2	2.1	2.2	2.6	2.6	2.5	2.4	2.1	2.1	2.0	2.4	2.1	1.9	2.0	2.2	2.1	2.0	2.3	2.5	2.4	2.3	2.3	2.7	2.6	2.7	2.6	2.6	2.7	2.9	2.7	2.5
3.2	2.9	2.6	2.8	2.9	2.7	2.7	2.9	3.2	3.4	3.5	3.3	3.0	2.1	1.7	2.7	2.4	2.6	2.8	3.3	3.4	3.3	2.9	2.7	2.8	2.7	2.9	3.6	3.5	3.4	3.5	3.5	3.7	3.5	3.3	3.1
3.6	3.7	4.6	4.7	4.4	4.3	4.0	3.8	3.6	3.3	3.3	3.6	3.2	2.9	3.1	3.4	3.7	3.5	3.7	4.3	4.1	4.3	3.6	3.8	3.9	3.8	4.3	5.0	4.4	4.5	4.4	4.6	3.9	3.5	3.6	3.3
4.0	4.7	4.8	3.3	3.8	4.3	5.0	5.0	5.8	5.0	5.3	5.0	4.8	4.8	4.4	4.2	4.6	4.4	4.9	6.1	5.2	5.1	5.2	4.6	5.2	5.1	5.3	6.3	5.4	5.6	5.8	5.3	4.0	3.5	3.7	4.3
5.8	5.2	4.4	3.9	3.6	2.9	5.4	6.1	7.8	7.3	6.1	6.2	6.2	5.5	4.5	3.9	3.6	4.1	5.0	4.9	5.5	4.9	5.7	4.8	4.7	6.2	7.7	8.0	7.8	7.2	7.0	5.6	5.3	6.4	6.5	6.8
4.5	4.8	5.0	4.2	3.0	3.5	7.1	6.9	6.7	8.4	8.4	7.0	6.1	3.1	1.9	1.8	1.4	4.4	3.6	1.2	.9	1.3	1.7	3.7	2.5	5.5	6.6	7.2	6.8	6.3	6.7	6.0	7.1	7.3	7.5	6.8
5.4	6.6	4.2	3.5	1.8	1.6	4.9	8.1	7.4	7.0	6.5	5.3	4.1	2.8	1.2	1.8	2.8	3.8	3.3	1.5	1.0	1.4	2.5	4.4	6.0	5.2	5.7	5.5	6.6	4.0	3.6	5.5	5.9	6.2	9.4	7.4
6.1	5.3	4.5	5.4	6.5	6.3	6.3	10.5	11.0	9.8	7.2	7.2	5.3	4.2	4.6	5.3	9.4	9.4	8.2	9.9	7.9	7.4	5.7	4.5	2.6	10.7	10.2	10.0	9.4	7.0	9.2	8.7	7.8	8.3	7.4	5.8
9.9	9.4	8.0	7.7	7.5	6.2	6.2	8.3	9.2	8.7	10.8	9.9	8.6	7.8	7.7	7.5	7.2	4.9	7.4	9.3	10.5	7.8	3.6	5.7	11.6	9.2	9.3	10.2	10.3	10.3	10.5	11.7	10.0	10.1	10.7	10.8
7.8	4.6	1.8	1.2	.7	.6	.8	.9	1.1	1.4	5.8	7.1	4.1	2.5	1.5	1.1	1.1	.7	1.9	5.3	5.8	3.2	3.3	8.7	12.2	11.1	10.0	8.3	6.5	5.7	6.1	7.9	9.1	11.3	10.9	8.6
5.5	5.0	3.2	2.7	1.7	1.5	1.9	.8	.7	.9	3.2	3.1	2.2	1.6	1.2	1.0	1.5	.9	1.3	1.9	1.3	1.4	2.0	4.3	5.7	5.1	4.3	2.7	1.5	1.9	2.7	2.0	3.2	6.1	6.5	8.1
5.4	7.9	6.9	5.1	5.9	6.5	6.7	4.3	2.1	1.8	4.1	4.2	7.0	6.7	3.7	2.7	3.0	2.5	2.5	2.0	1.3	1.4	1.3	1.2	1.6	1.0	.9	1.6	2.7	3.6	3.4	1.6	2.0	2.6	3.7	6.4
5.9	7.1	7.8	7.2	6.6	7.4	7.5	7.2	6.6	5.4	5.2	6.0	7.1	7.1	8.0	6.9	5.8	5.5	4.2	3.5	4.1	3.5	3.7	4.1	4.0	3.1	2.8	3.0	3.7	4.0	4.8	3.8	4.2	4.5	5.2	5.2
4.5	5.1	5.3	5.6	6.0	5.8	6.3	6.7	6.6	6.3	6.2	6.4	6.1	5.7	5.3	5.6	6.0	5.2	6.1	5.5	5.2	4.8	5.7	5.7	5.6	5.5	5.2	5.1	5.2	5.4	6.0	5.7	5.6	5.2	5.6	4.5
3.4	3.9	4.3	4.6	4.8	4.9	5.5	5.4	6.1	6.1	6.0	6.7	5.9	5.9	5.2	5.2	5.1	4.6	4.5	5.1	5.1	4.1	4.6	4.8	5.8	6.0	5.0	5.2	5.0	5.3	5.4	5.5	5.0	5.3	4.0	3.5
4.2	3.5	3.8	4.0	4.5	4.2	4.4	5.4	5.7	5.5	5.4	6.2	7.2	5.6	4.8	4.3	4.0	3.9	4.0	4.0	4.8	5.1	4.7	4.9	4.8	5.1	4.8	4.3	4.5	4.5	4.8	5.0	5.5	5.2	5.2	4.6
2.8	3.3	4.3	4.8	5.1	5.3	4.9	5.1	4.6	4.0	5.7	6.3	5.4	4.6	3.7	2.4	2.7	2.9	3.6	3.2	3.3	3.3	3.9	3.2	3.3	3.0	2.4	2.0	1.5	1.6	2.0	1.9	1.8	1.9	3.3	3.0
3.1	3.3	4.5	5.1	5.1	5.1	4.9	4.1	4.4	4.6	3.9	3.8	3.7	3.0	2.2	1.4	1.0	1.0	1.2	1.4	1.3	1.2	1.7	1.6	1.4	1.6	1.5	1.8	1.9	2.3	2.5	2.6	2.7	3.2	3.7	3.5

Figure 60. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations

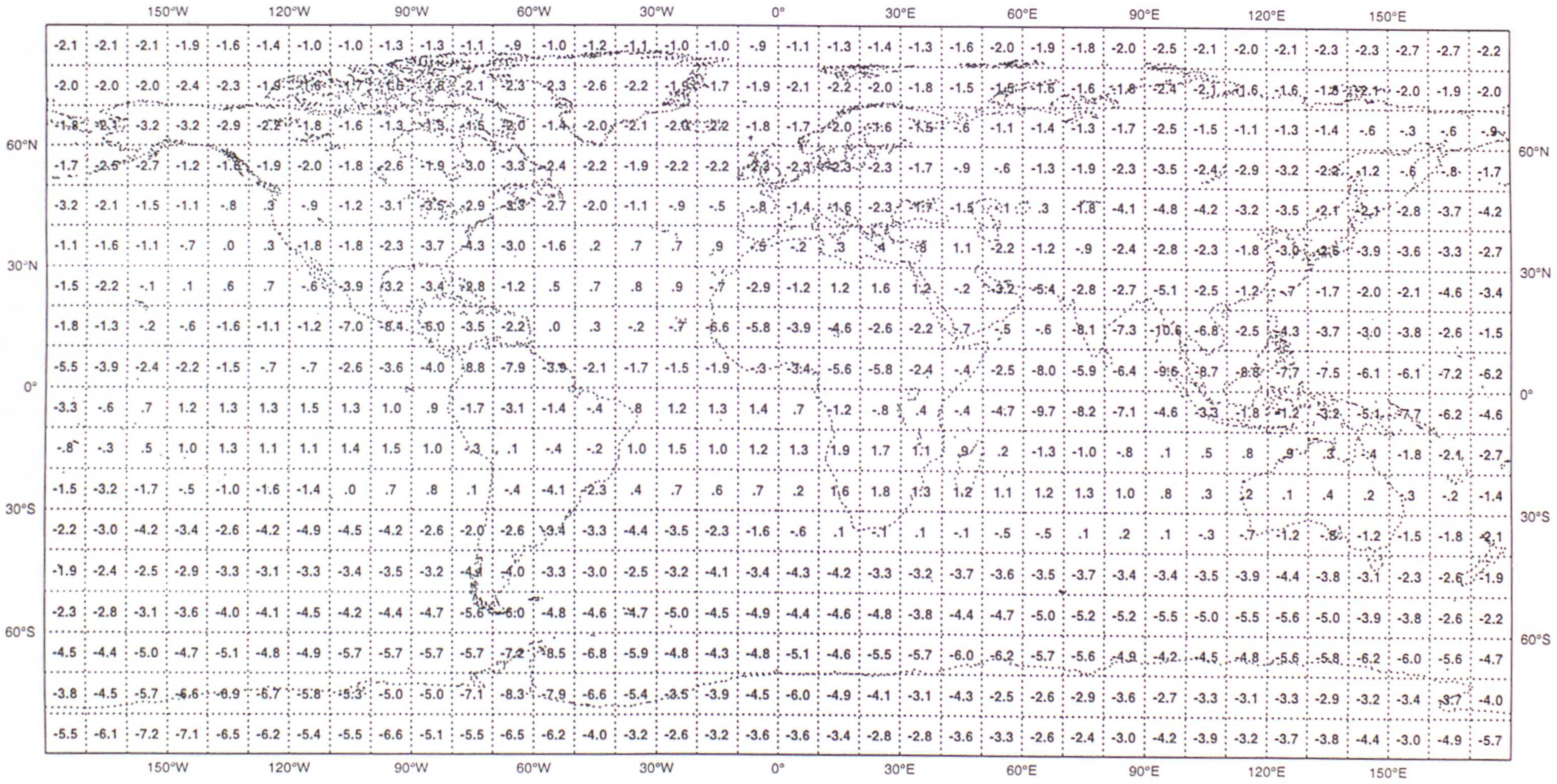
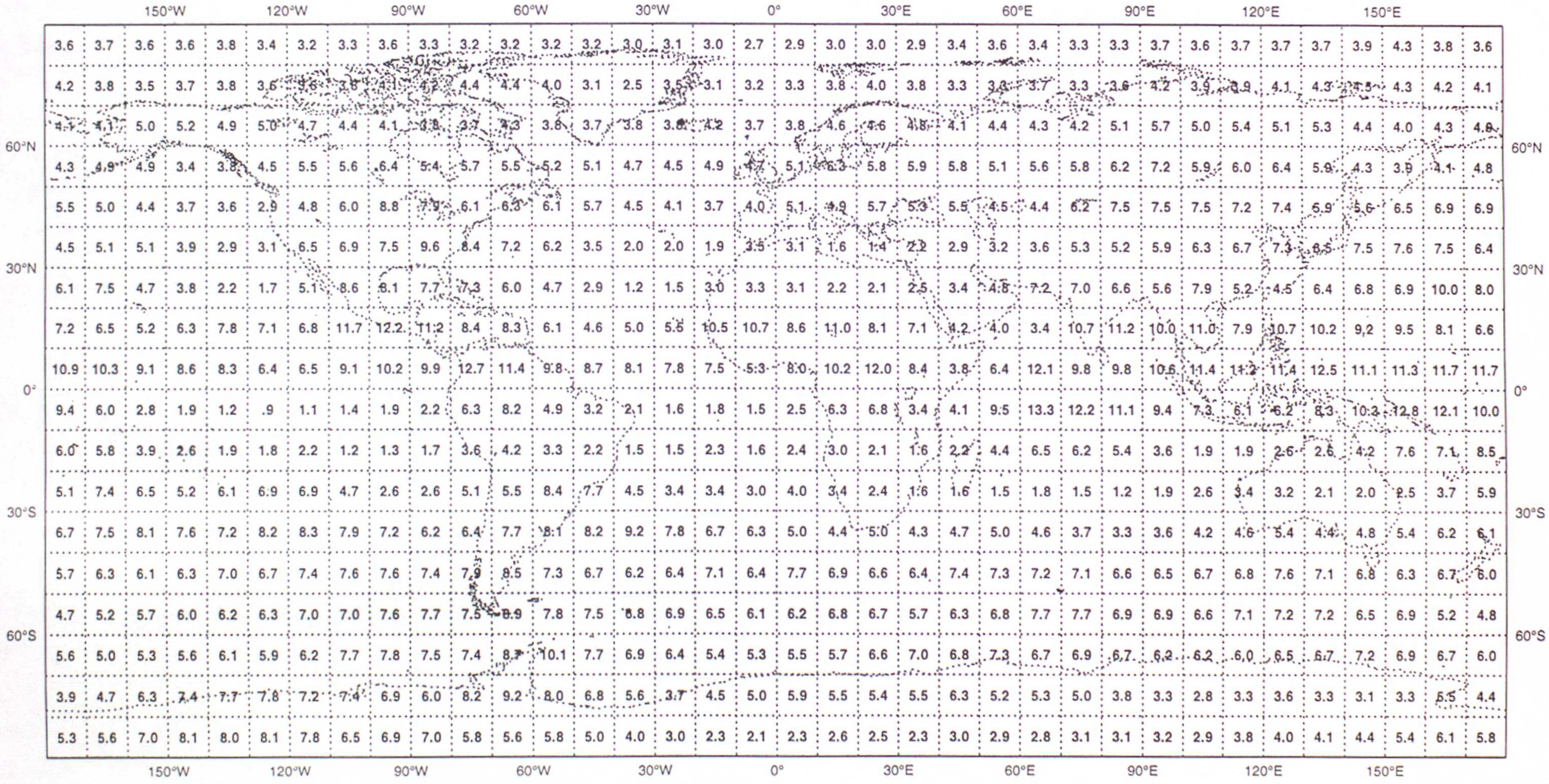

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-2.1 -2.1 -2.1 -1.9 -1.6 -1.4 -1.0 -1.0 -1.3 -1.3 -1.1 -.9 -1.0 -1.2 -1.1 -1.0 -1.0 -.9 -1.1 -1.3 -1.4 -1.3 -1.6 -2.0 -1.9 -1.8 -2.0 -2.5 -2.1 -2.0 -2.1 -2.3 -2.3 -2.7 -2.7 -2.2
-2.0 -2.0 -2.0 -2.4 -2.3 -1.9 -1.6 -1.7 -1.6 -1.8 -2.1 -2.3 -2.3 -2.6 -2.2 -1.9 -1.7 -1.9 -2.1 -2.2 -2.0 -1.8 -1.5 -1.5 -1.6 -1.6 -1.8 -2.4 -2.1 -1.6 -1.6 -1.8 -2.1 -2.0 -1.9 -2.0
-1.8 -2.1 -3.2 -3.2 -2.9 -2.2 -1.8 -1.6 -1.3 -1.3 -1.5 -2.0 -1.4 -2.0 -2.1 -2.0 -2.2 -1.8 -1.7 -2.0 -1.6 -1.5 -.6 -1.1 -1.4 -1.3 -1.7 -2.5 -1.5 -1.1 -1.3 -1.4 -.6 -.3 -.6 -.9
-1.7 -2.5 -2.7 -1.2 -1.8 -1.9 -2.0 -1.8 -2.6 -1.9 -3.0 -3.3 -2.4 -2.2 -1.9 -2.2 -2.2 -2.3 -2.3 -2.3 -2.3 -1.7 -.9 -.6 -1.3 -1.9 -2.3 -3.5 -2.4 -2.9 -3.2 -2.2 -1.2 -.6 -.8 -1.7
-3.2 -2.1 -1.5 -1.1 -.8 .3 -.9 -1.2 -3.1 -3.5 -2.9 -3.3 -2.7 -2.0 -1.1 -.9 -.5 -.8 -1.4 -1.6 -2.3 -1.7 -1.5 -.1 .3 -1.8 -4.1 -4.8 -4.2 -3.2 -3.5 -2.1 -2.1 -2.8 -3.7 -4.2
-1.1 -1.6 -1.1 -.7 .0 .3 -1.8 -1.8 -2.3 -3.7 -4.3 -3.0 -1.6 .2 .7 .7 .9 -.5 -.2 .3 .4 .8 1.1 -2.2 -1.2 -.9 -2.4 -2.8 -2.3 -1.8 -3.0 -2.6 -3.9 -3.6 -3.3 -2.7
-1.5 -2.2 -.1 .1 .6 .7 -.6 -3.9 -3.2 -3.4 -2.8 -1.2 .5 .7 .8 .9 -.7 -2.9 -1.2 1.2 1.6 1.2 -.2 -3.2 -5.4 -2.8 -2.7 -5.1 -2.5 -1.2 -.7 -1.7 -2.0 -2.1 -4.6 -3.4
-1.8 -1.3 -.2 -.6 -1.6 -1.1 -1.2 -7.0 -8.4 -6.0 -3.5 -2.2 .0 .3 -.2 -.7 -6.6 -5.8 -3.9 -4.6 -2.6 -2.2 -.7 -.5 -.6 -8.1 -7.3 -10.6 -6.8 -2.5 -4.3 -3.7 -3.0 -3.8 -2.6 -1.5
-5.5 -3.9 -2.4 -2.2 -1.5 -.7 -.7 -2.6 -3.6 -4.0 -8.8 -7.9 -3.9 -2.1 -1.7 -1.5 -1.9 -.3 -3.4 -5.6 -5.8 -2.4 -.4 -2.5 -8.0 -5.9 -6.4 -9.6 -8.7 -8.8 -7.7 -7.5 -6.1 -6.1 -7.2 -6.2
-3.3 -.6 .7 1.2 1.3 1.3 1.5 1.3 1.0 .9 -1.7 -3.1 -1.4 -.4 .8 1.2 1.3 1.4 .7 -1.2 -.8 .4 -.4 -4.7 -9.7 -8.2 -7.1 -4.6 -3.3 -1.8 -1.2 -3.2 -5.1 -7.7 -6.2 -4.6
-.8 -.3 .5 1.0 1.3 1.1 1.1 1.4 1.5 1.0 -.3 .1 -.4 -.2 1.0 1.5 1.0 1.2 1.3 1.9 1.7 1.1 .9 .2 -1.3 -1.0 -.8 .1 .5 .8 .9 .3 .4 -1.8 -2.1 -2.7
-1.5 -3.2 -1.7 -.5 -1.0 -1.6 -1.4 .0 .7 .8 .1 -.4 -4.1 -2.3 .4 .7 .6 .7 .2 1.6 1.8 1.3 1.2 1.1 1.2 1.3 1.0 .8 .3 .2 .1 .4 .2 -.3 -.2 -1.4
-2.2 -3.0 -4.2 -3.4 -2.6 -4.2 -4.9 -4.5 -4.2 -2.6 -2.0 -2.6 -3.4 -3.3 -4.4 -3.5 -2.3 -1.6 -.6 .1 -.1 .1 -.1 -.5 -.5 .1 .2 .1 -.3 -.7 -1.2 -.8 -1.2 -1.5 -1.8 -2.1
-1.9 -2.4 -2.5 -2.9 -3.3 -3.1 -3.3 -3.4 -3.5 -3.2 -4.4 -4.0 -3.3 -3.0 -2.5 -3.2 -4.1 -3.4 -4.3 -4.2 -3.3 -3.2 -3.7 -3.6 -3.5 -3.7 -3.4 -3.4 -3.5 -3.9 -4.4 -3.8 -3.1 -2.3 -2.6 -1.9
-2.3 -2.8 -3.1 -3.6 -4.0 -4.1 -4.5 -4.2 -4.4 -4.7 -5.6 -6.0 -4.8 -4.6 -4.7 -5.0 -4.5 -4.9 -4.4 -4.6 -4.8 -3.8 -4.4 -4.7 -5.0 -5.2 -5.2 -5.5 -5.0 -5.5 -5.6 -5.0 -3.9 -3.8 -2.6 -2.2
-4.5 -4.4 -5.0 -4.7 -5.1 -4.8 -4.9 -5.7 -5.7 -5.7 -5.7 -7.2 -8.5 -6.8 -5.9 -4.8 -4.3 -4.8 -5.1 -4.6 -5.5 -5.7 -6.0 -6.2 -5.7 -5.6 -4.9 -4.2 -4.5 -4.8 -5.6 -5.8 -6.2 -6.0 -5.6 -4.7
-3.8 -4.5 -5.7 -6.6 -6.9 -6.7 -5.8 -5.3 -5.0 -5.0 -7.1 -8.3 -7.9 -6.6 -5.4 -3.5 -3.9 -4.5 -6.0 -4.9 -4.1 -3.1 -4.3 -2.5 -2.6 -2.9 -3.6 -2.7 -3.3 -3.1 -3.3 -2.9 -3.2 -3.4 -3.7 -4.0
-5.5 -6.1 -7.2 -7.1 -6.5 -6.2 -5.4 -5.5 -6.6 -5.1 -5.5 -6.5 -6.2 -4.0 -3.2 -2.6 -3.2 -3.6 -3.6 -3.4 -2.8 -2.8 -3.6 -3.3 -2.6 -2.4 -3.0 -4.2 -3.9 -3.2 -3.7 -3.8 -4.4 -3.0 -4.9 -5.7

Figure 61. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS11 (500 - 700 hPa)
NOAA17, using all observations



3.6	3.7	3.6	3.6	3.8	3.4	3.2	3.3	3.6	3.3	3.2	3.2	3.2	3.2	3.0	3.1	3.0	2.7	2.9	3.0	3.0	2.9	3.4	3.6	3.4	3.3	3.3	3.7	3.6	3.7	3.7	3.7	3.9	4.3	3.8	3.6
4.2	3.8	3.5	3.7	3.8	3.6	3.6	3.8	4.1	4.2	4.4	4.4	4.0	3.1	2.5	3.5	3.1	3.2	3.3	3.8	4.0	3.8	3.3	3.3	3.7	3.3	3.6	4.2	3.9	3.9	4.1	4.3	4.5	4.3	4.2	4.1
4.1	4.1	5.0	5.2	4.9	5.0	4.7	4.4	4.1	3.8	3.7	4.3	3.8	3.7	3.8	3.8	4.2	3.7	3.8	4.6	4.6	4.8	4.1	4.4	4.3	4.2	5.1	5.7	5.0	5.4	5.1	5.3	4.4	4.0	4.3	4.8
4.3	4.9	4.9	3.4	3.8	4.5	5.5	5.6	6.4	5.4	5.7	5.5	5.2	5.1	4.7	4.5	4.9	4.7	5.1	6.3	5.8	5.9	5.8	5.1	5.6	5.8	6.2	7.2	5.9	6.0	6.4	5.9	4.3	3.9	4.1	4.8
5.5	5.0	4.4	3.7	3.6	2.9	4.8	6.0	8.8	7.9	6.1	6.3	6.1	5.7	4.5	4.1	3.7	4.0	5.1	4.9	5.7	5.3	5.5	4.5	4.4	6.2	7.5	7.5	7.5	7.2	7.4	5.9	5.6	6.5	6.9	6.9
4.5	5.1	5.1	3.9	2.9	3.1	6.5	6.9	7.5	9.6	8.4	7.2	6.2	3.5	2.0	2.0	1.9	3.5	3.1	1.6	1.4	2.2	2.9	3.2	3.6	5.3	5.2	5.9	6.3	6.7	7.3	6.5	7.5	7.6	7.5	6.4
6.1	7.5	4.7	3.8	2.2	1.7	5.1	8.6	8.1	7.7	7.3	6.0	4.7	2.9	1.2	1.5	3.0	3.3	3.1	2.2	2.1	2.5	3.4	4.8	7.2	7.0	6.6	5.6	7.9	5.2	4.5	6.4	6.8	6.9	10.0	8.0
7.2	6.5	5.2	6.3	7.8	7.1	6.8	11.7	12.2	11.2	8.4	8.3	6.1	4.6	5.0	5.5	10.5	10.7	8.6	11.0	8.1	7.1	4.2	4.0	3.4	10.7	11.2	10.0	11.0	7.9	10.7	10.2	9.2	9.5	8.1	6.6
10.9	10.3	9.1	8.6	8.3	6.4	6.5	9.1	10.2	9.9	12.7	11.4	9.8	8.7	8.1	7.8	7.5	5.3	8.0	10.2	12.0	8.4	3.8	6.4	12.1	9.8	9.8	10.6	11.4	11.2	11.4	12.5	11.1	11.3	11.7	11.7
9.4	6.0	2.8	1.9	1.2	.9	1.1	1.4	1.9	2.2	6.3	8.2	4.9	3.2	2.1	1.6	1.8	1.5	2.5	6.3	6.8	3.4	4.1	9.5	13.3	12.2	11.1	9.4	7.3	6.1	6.2	8.3	10.3	12.8	12.1	10.0
6.0	5.8	3.9	2.6	1.9	1.8	2.2	1.2	1.3	1.7	3.6	4.2	3.3	2.2	1.5	1.5	2.3	1.6	2.4	3.0	2.1	1.6	2.2	4.4	6.5	6.2	5.4	3.6	1.9	1.9	2.6	2.6	4.2	7.6	7.1	8.5
5.1	7.4	6.5	5.2	6.1	6.9	6.9	4.7	2.6	2.6	5.1	5.5	8.4	7.7	4.5	3.4	3.4	3.0	4.0	3.4	2.4	1.6	1.6	1.5	1.8	1.5	1.2	1.9	2.6	3.4	3.2	2.1	2.0	2.5	3.7	5.9
6.7	7.5	8.1	7.6	7.2	8.2	8.3	7.9	7.2	6.2	6.4	7.7	8.1	8.2	9.2	7.8	6.7	6.3	5.0	4.4	5.0	4.3	4.7	5.0	4.6	3.7	3.3	3.6	4.2	4.6	5.4	4.4	4.8	5.4	6.2	6.1
5.7	6.3	6.1	6.3	7.0	6.7	7.4	7.6	7.6	7.4	7.9	8.5	7.3	6.7	6.2	6.4	7.1	6.4	7.7	6.9	6.6	6.4	7.4	7.3	7.2	7.1	6.6	6.5	6.7	6.8	7.6	7.1	6.8	6.3	6.7	6.0
4.7	5.2	5.7	6.0	6.2	6.3	7.0	7.0	7.6	7.7	7.5	8.9	7.8	7.5	8.8	6.9	6.5	6.1	6.2	6.8	6.7	5.7	6.3	6.8	7.7	7.7	6.9	6.9	6.6	7.1	7.2	7.2	6.5	6.9	5.2	4.8
5.6	5.0	5.3	5.6	6.1	5.9	6.2	7.7	7.8	7.5	7.4	8.7	10.1	7.7	6.9	6.4	5.4	5.3	5.5	5.7	6.6	7.0	6.8	7.3	6.7	6.9	6.7	6.2	6.2	6.0	6.5	6.7	7.2	6.9	6.7	6.0
3.9	4.7	6.3	7.4	7.7	7.8	7.2	7.4	6.9	6.0	8.2	9.2	8.0	6.8	5.6	3.7	4.5	5.0	5.9	5.5	5.4	5.5	6.3	5.2	5.3	5.0	3.8	3.3	2.8	3.3	3.6	3.3	3.1	3.3	5.5	4.4
5.3	5.6	7.0	8.1	8.0	8.1	7.8	6.5	6.9	7.0	5.8	5.6	5.8	5.0	4.0	3.0	2.3	2.1	2.3	2.6	2.5	2.3	3.0	2.9	2.8	3.1	3.1	3.2	2.9	3.8	4.0	4.1	4.4	5.4	6.1	5.8

Figure 62. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations

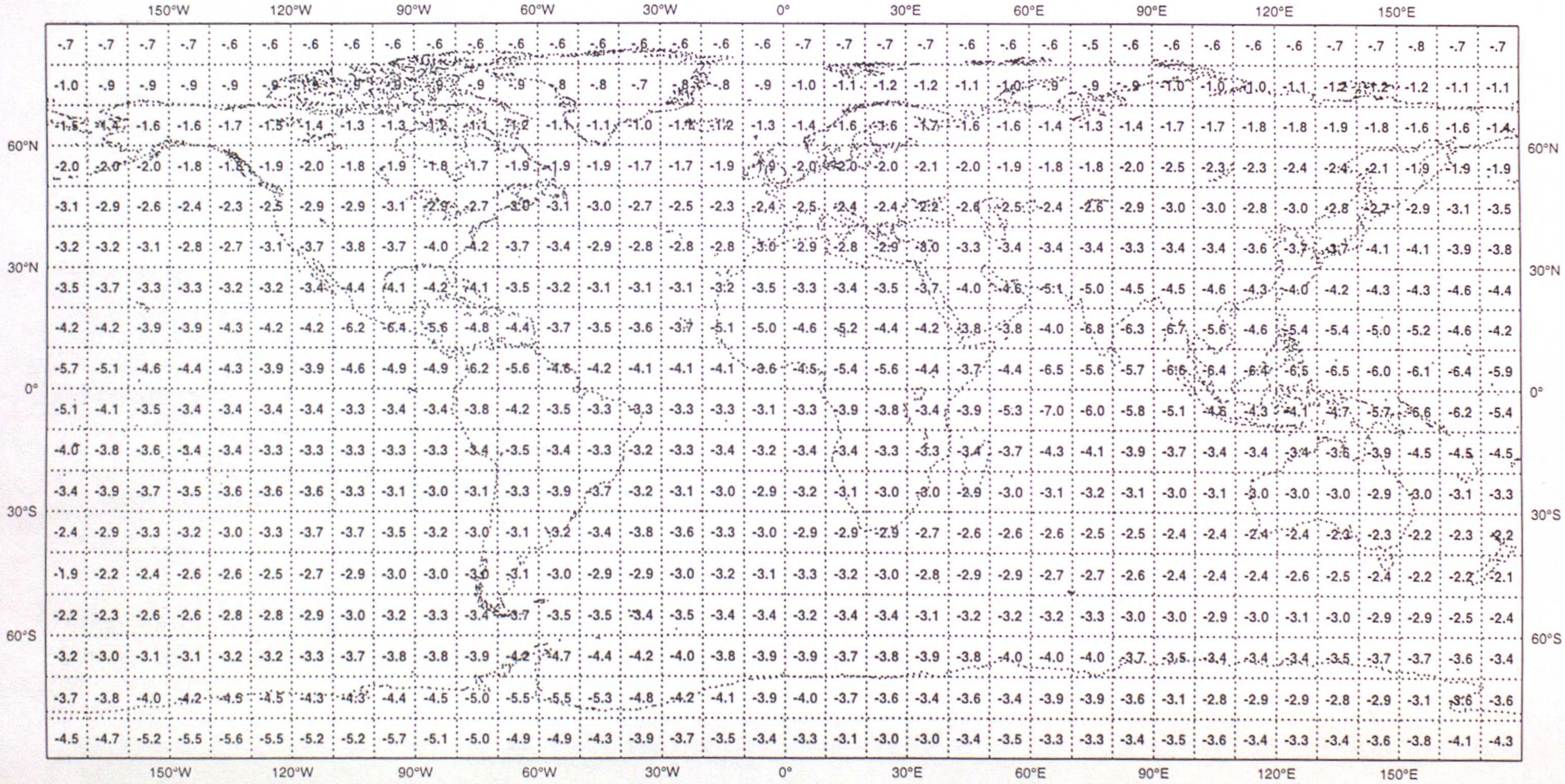
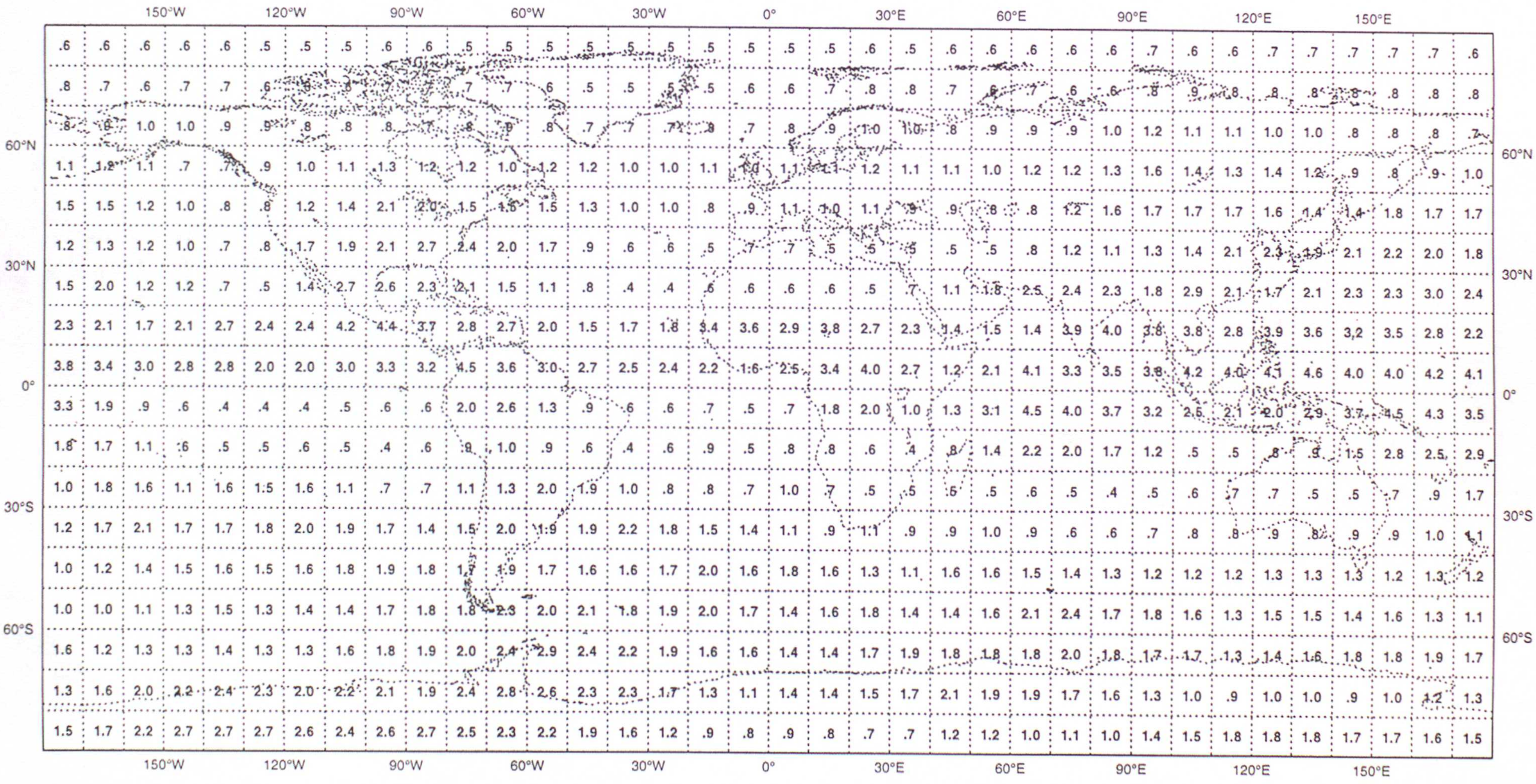

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S
-.7 -.7 -.7 -.7 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.7 -.6 -.6 -.6 -.5 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.8 -.7 -.7
-1.0 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.9 -.8 -.8 -.7 -.8 -.8 -.9 -1.0 -1.1 -1.2 -1.2 -1.1 -1.0 -.9 -.9 -.9 -1.0 -1.0 -1.0 -1.1 -1.2 -1.2 -1.2 -1.1 -1.1
-1.5 -1.4 -1.6 -1.6 -1.7 -1.5 -1.4 -1.3 -1.3 -1.2 -1.1 -1.2 -1.1 -1.1 -1.0 -1.2 -1.2 -1.3 -1.4 -1.6 -1.6 -1.7 -1.6 -1.6 -1.4 -1.3 -1.4 -1.7 -1.7 -1.8 -1.8 -1.9 -1.8 -1.6 -1.6 -1.4
-2.0 -2.0 -2.0 -1.8 -1.8 -1.9 -2.0 -1.8 -1.9 -1.8 -1.7 -1.9 -1.9 -1.9 -1.7 -1.7 -1.9 -1.9 -2.0 -2.0 -2.0 -2.1 -2.0 -1.9 -1.8 -1.8 -2.0 -2.5 -2.3 -2.3 -2.4 -2.4 -2.1 -1.9 -1.9 -1.9
-3.1 -2.9 -2.6 -2.4 -2.3 -2.5 -2.9 -2.9 -3.1 -2.9 -2.7 -3.0 -3.1 -3.0 -2.7 -2.5 -2.3 -2.4 -2.5 -2.4 -2.4 -2.2 -2.6 -2.5 -2.4 -2.6 -2.9 -3.0 -3.0 -2.8 -3.0 -2.8 -2.7 -2.9 -3.1 -3.5
-3.2 -3.2 -3.1 -2.8 -2.7 -3.1 -3.7 -3.8 -3.7 -4.0 -4.2 -3.7 -3.4 -2.9 -2.8 -2.8 -2.8 -3.0 -2.9 -2.8 -2.9 -3.0 -3.3 -3.4 -3.4 -3.4 -3.3 -3.4 -3.4 -3.6 -3.7 -3.7 -4.1 -4.1 -3.9 -3.8
-3.5 -3.7 -3.3 -3.3 -3.2 -3.2 -3.4 -4.4 -4.1 -4.2 -4.1 -3.5 -3.2 -3.1 -3.1 -3.1 -3.2 -3.5 -3.3 -3.4 -3.5 -3.7 -4.0 -4.6 -5.1 -5.0 -4.5 -4.5 -4.6 -4.3 -4.0 -4.2 -4.3 -4.3 -4.6 -4.4
-4.2 -4.2 -3.9 -3.9 -4.3 -4.2 -4.2 -6.2 -6.4 -5.6 -4.8 -4.4 -3.7 -3.5 -3.6 -3.7 -5.1 -5.0 -4.6 -5.2 -4.4 -4.2 -3.8 -3.8 -4.0 -6.8 -6.3 -6.7 -5.6 -4.6 -5.4 -5.4 -5.0 -5.2 -4.6 -4.2
-5.7 -5.1 -4.6 -4.4 -4.3 -3.9 -3.9 -4.6 -4.9 -4.9 -6.2 -5.6 -4.6 -4.2 -4.1 -4.1 -4.1 -3.6 -4.5 -5.4 -5.6 -4.4 -3.7 -4.4 -6.5 -5.6 -5.7 -6.6 -6.4 -6.4 -6.5 -6.5 -6.0 -6.1 -6.4 -5.9
-5.1 -4.1 -3.5 -3.4 -3.4 -3.4 -3.4 -3.3 -3.4 -3.4 -3.8 -4.2 -3.5 -3.3 -3.3 -3.3 -3.3 -3.1 -3.3 -3.9 -3.8 -3.4 -3.9 -5.3 -7.0 -6.0 -5.8 -5.1 -4.6 -4.3 -4.1 -4.7 -5.7 -6.6 -6.2 -5.4
-4.0 -3.8 -3.6 -3.4 -3.4 -3.3 -3.3 -3.3 -3.3 -3.3 -3.4 -3.5 -3.4 -3.3 -3.2 -3.3 -3.4 -3.2 -3.4 -3.4 -3.3 -3.3 -3.4 -3.7 -4.3 -4.1 -3.9 -3.7 -3.4 -3.4 -3.4 -3.6 -3.9 -4.5 -4.5 -4.5
-3.4 -3.9 -3.7 -3.5 -3.6 -3.6 -3.6 -3.3 -3.1 -3.0 -3.1 -3.3 -3.9 -3.7 -3.2 -3.1 -3.0 -2.9 -3.2 -3.1 -3.0 -3.0 -2.9 -3.0 -3.1 -3.2 -3.1 -3.0 -3.1 -3.0 -3.0 -3.0 -2.9 -3.0 -3.1 -3.3
-2.4 -2.9 -3.3 -3.2 -3.0 -3.3 -3.7 -3.7 -3.5 -3.2 -3.0 -3.1 -3.2 -3.4 -3.8 -3.6 -3.3 -3.0 -2.9 -2.9 -2.9 -2.7 -2.6 -2.6 -2.6 -2.5 -2.5 -2.4 -2.4 -2.4 -2.4 -2.3 -2.3 -2.2 -2.3 -2.2
-1.9 -2.2 -2.4 -2.6 -2.6 -2.5 -2.7 -2.9 -3.0 -3.0 -3.0 -3.1 -3.0 -2.9 -2.9 -3.0 -3.2 -3.1 -3.3 -3.2 -3.0 -2.8 -2.9 -2.9 -2.7 -2.7 -2.6 -2.4 -2.4 -2.4 -2.6 -2.5 -2.4 -2.2 -2.2 -2.1
-2.2 -2.3 -2.6 -2.6 -2.8 -2.8 -2.9 -3.0 -3.2 -3.3 -3.4 -3.7 -3.5 -3.5 -3.4 -3.5 -3.4 -3.4 -3.2 -3.4 -3.4 -3.1 -3.2 -3.2 -3.2 -3.3 -3.0 -3.0 -2.9 -3.0 -3.1 -3.0 -2.9 -2.9 -2.5 -2.4
-3.2 -3.0 -3.1 -3.1 -3.2 -3.2 -3.3 -3.7 -3.8 -3.8 -3.9 -4.2 -4.7 -4.4 -4.2 -4.0 -3.8 -3.9 -3.9 -3.7 -3.8 -3.9 -3.8 -4.0 -4.0 -4.0 -3.7 -3.5 -3.4 -3.4 -3.4 -3.5 -3.7 -3.7 -3.6 -3.4
-3.7 -3.8 -4.0 -4.2 -4.5 -4.5 -4.3 -4.3 -4.4 -4.5 -5.0 -5.5 -5.5 -5.3 -4.8 -4.2 -4.1 -3.9 -4.0 -3.7 -3.6 -3.4 -3.6 -3.4 -3.9 -3.9 -3.6 -3.1 -2.8 -2.9 -2.9 -2.8 -2.9 -3.1 -3.6 -3.6
-4.5 -4.7 -5.2 -5.5 -5.6 -5.5 -5.2 -5.2 -5.7 -5.1 -5.0 -4.9 -4.9 -4.3 -3.9 -3.7 -3.5 -3.4 -3.3 -3.1 -3.0 -3.0 -3.4 -3.5 -3.3 -3.3 -3.4 -3.5 -3.6 -3.4 -3.3 -3.4 -3.6 -3.8 -4.1 -4.3

Figure 63. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: HIRS4 (400 hPa)
NOAA17, using all observations



.6	.6	.6	.6	.6	.5	.5	.5	.6	.6	.5	.5	.5	.5	.5	.5	.5	.5	.5	.5	.6	.5	.6	.6	.6	.6	.6	.7	.6	.6	.7	.7	.7	.7	.7	.6
.8	.7	.6	.7	.7	.6	.8	.8	.7	.7	.7	.7	.6	.5	.5	.5	.5	.6	.6	.7	.8	.8	.7	.6	.7	.6	.6	.8	.9	.8	.8	.8	.8	.8	.8	.8
.8	.8	1.0	1.0	.9	.9	.8	.8	.8	.7	.8	.9	.8	.7	.7	.7	.8	.7	.8	.9	1.0	1.0	.8	.9	.9	.9	1.0	1.2	1.1	1.1	1.0	1.0	.8	.8	.8	.7
1.1	1.2	1.1	.7	.7	.9	1.0	1.1	1.3	1.2	1.2	1.0	1.2	1.2	1.0	1.0	1.1	1.0	1.1	1.1	1.2	1.1	1.1	1.0	1.2	1.2	1.3	1.6	1.4	1.3	1.4	1.2	.9	.8	.9	1.0
1.5	1.5	1.2	1.0	.8	.8	1.2	1.4	2.1	2.0	1.5	1.5	1.5	1.3	1.0	1.0	.8	.9	1.1	1.0	1.1	.9	.9	.8	.8	1.2	1.6	1.7	1.7	1.7	1.6	1.4	1.4	1.8	1.7	1.7
1.2	1.3	1.2	1.0	.7	.8	1.7	1.9	2.1	2.7	2.4	2.0	1.7	.9	.6	.6	.5	.7	.7	.5	.5	.5	.5	.5	.8	1.2	1.1	1.3	1.4	2.1	2.3	1.9	2.1	2.2	2.0	1.8
1.5	2.0	1.2	1.2	.7	.5	1.4	2.7	2.6	2.3	2.1	1.5	1.1	.8	.4	.4	.6	.6	.6	.6	.5	.7	1.1	1.8	2.5	2.4	2.3	1.8	2.9	2.1	1.7	2.1	2.3	2.3	3.0	2.4
2.3	2.1	1.7	2.1	2.7	2.4	2.4	4.2	4.4	3.7	2.8	2.7	2.0	1.5	1.7	1.8	3.4	3.6	2.9	3.8	2.7	2.3	1.4	1.5	1.4	3.9	4.0	3.8	3.8	2.8	3.9	3.6	3.2	3.5	2.8	2.2
3.8	3.4	3.0	2.8	2.8	2.0	2.0	3.0	3.3	3.2	4.5	3.6	3.0	2.7	2.5	2.4	2.2	1.6	2.5	3.4	4.0	2.7	1.2	2.1	4.1	3.3	3.5	3.8	4.2	4.0	4.1	4.6	4.0	4.0	4.2	4.1
3.3	1.9	.9	.6	.4	.4	.4	.5	.6	.6	2.0	2.6	1.3	.9	.6	.6	.7	.5	.7	1.8	2.0	1.0	1.3	3.1	4.5	4.0	3.7	3.2	2.5	2.1	2.0	2.9	3.7	4.5	4.3	3.5
1.8	1.7	1.1	.6	.5	.5	.6	.5	.4	.6	.9	1.0	.9	.6	.4	.6	.9	.5	.8	.8	.6	.4	.8	1.4	2.2	2.0	1.7	1.2	.5	.5	.8	.9	1.5	2.8	2.5	2.9
1.0	1.8	1.6	1.1	1.6	1.5	1.6	1.1	.7	.7	1.1	1.3	2.0	1.9	1.0	.8	.8	.7	1.0	.7	.5	.5	.5	.5	.6	.5	.4	.5	.6	.7	.7	.5	.5	.7	.9	1.7
1.2	1.7	2.1	1.7	1.7	1.8	2.0	1.9	1.7	1.4	1.5	2.0	1.9	1.9	2.2	1.8	1.5	1.4	1.1	.9	1.1	.9	.9	1.0	.9	.6	.6	.7	.8	.8	.9	.8	.9	.9	1.0	1.1
1.0	1.2	1.4	1.5	1.6	1.5	1.6	1.8	1.9	1.8	1.7	1.9	1.7	1.6	1.6	1.7	2.0	1.6	1.8	1.6	1.3	1.1	1.6	1.6	1.5	1.4	1.3	1.2	1.2	1.2	1.3	1.3	1.3	1.2	1.3	1.2
1.0	1.0	1.1	1.3	1.5	1.3	1.4	1.4	1.7	1.8	1.8	2.3	2.0	2.1	1.8	1.9	2.0	1.7	1.4	1.6	1.8	1.4	1.4	1.6	2.1	2.4	1.7	1.8	1.6	1.3	1.5	1.5	1.4	1.6	1.3	1.1
1.6	1.2	1.3	1.3	1.4	1.3	1.3	1.6	1.8	1.9	2.0	2.4	2.9	2.4	2.2	1.9	1.6	1.6	1.4	1.4	1.7	1.9	1.8	1.8	1.8	2.0	1.8	1.7	1.7	1.3	1.4	1.6	1.8	1.8	1.9	1.7
1.3	1.6	2.0	2.2	2.4	2.3	2.0	2.2	2.1	1.9	2.4	2.8	2.6	2.3	2.3	1.7	1.3	1.1	1.4	1.4	1.5	1.7	2.1	1.9	1.9	1.7	1.6	1.3	1.0	.9	1.0	1.0	.9	1.0	1.2	1.3
1.5	1.7	2.2	2.7	2.7	2.7	2.6	2.4	2.6	2.7	2.5	2.3	2.2	1.9	1.6	1.2	.9	.8	.9	.8	.7	.7	1.2	1.2	1.0	1.1	1.0	1.4	1.5	1.8	1.8	1.8	1.7	1.7	1.6	1.5

Figure 64. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

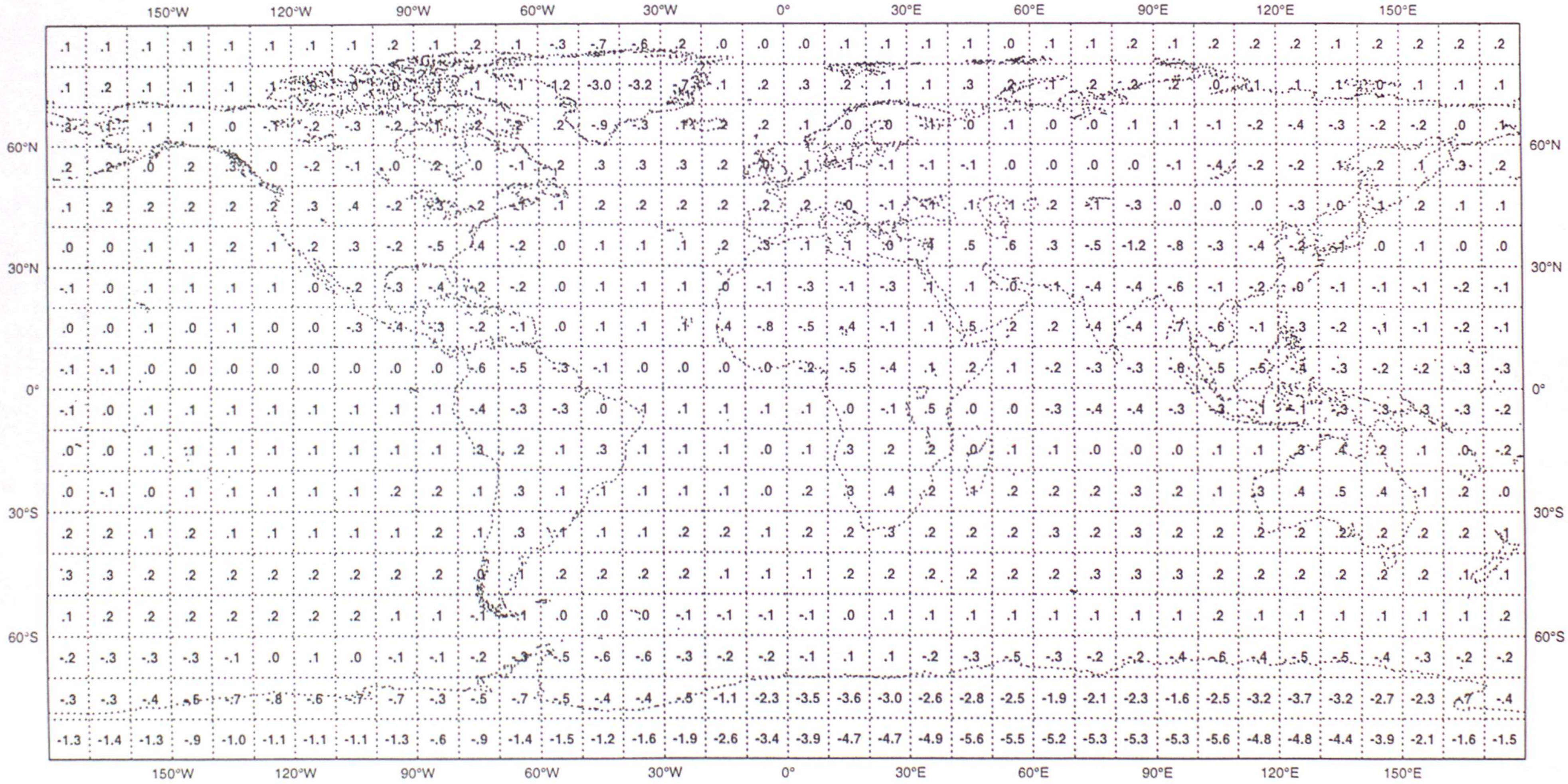

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 65. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-5 (700 hPa)
NOAA17, using all observations

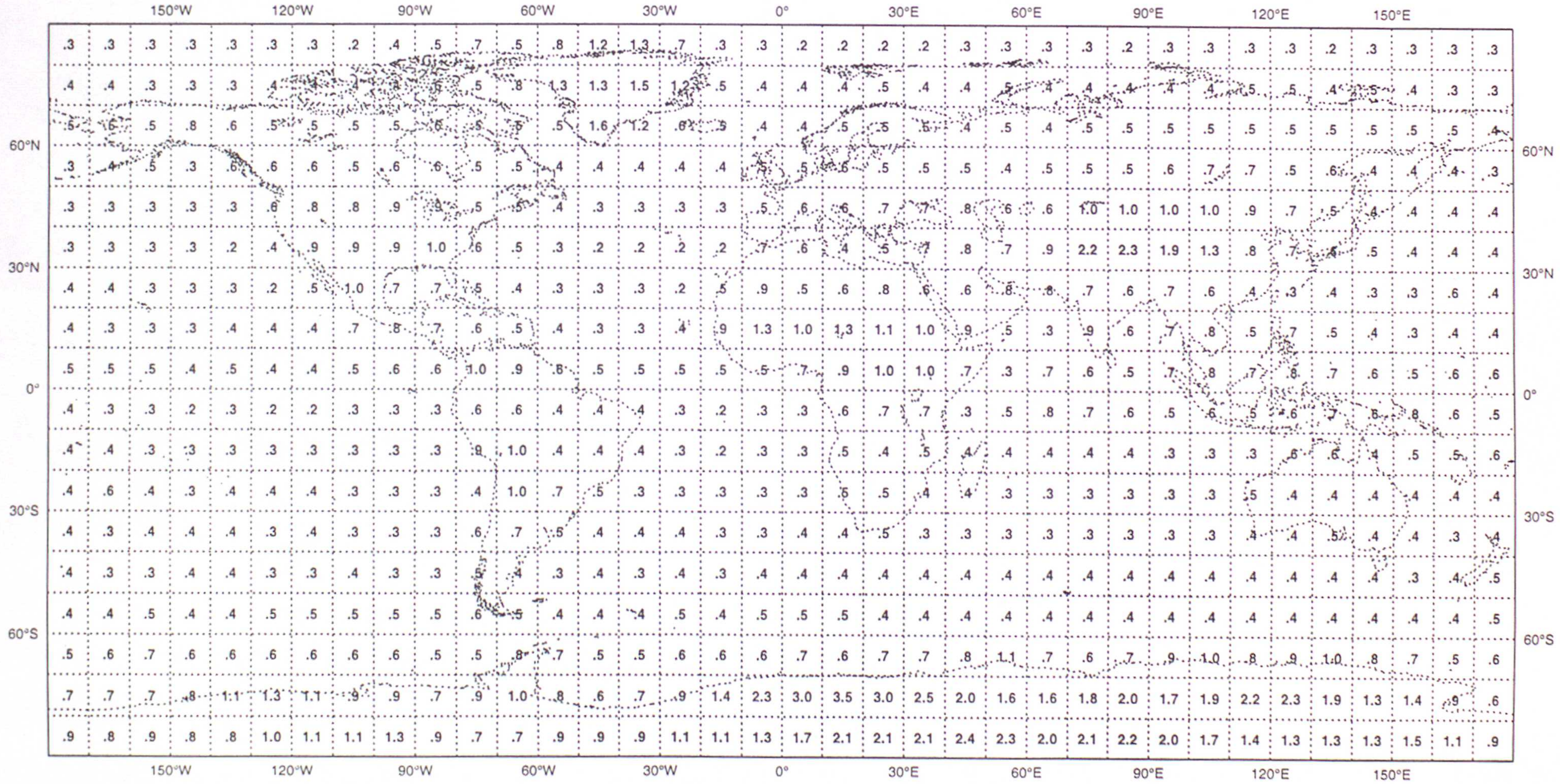

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.3 .3 .3 .3 .3 .3 .3 .2 .4 .5 .7 .5 .8 1.2 1.3 .7 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .2 .3 .3 .3 .3 .2 .3 .3 .3 .3
.4 .4 .3 .3 .3 .4 .4 .4 .4 .5 .5 .8 1.3 1.3 1.5 1.2 .5 .4 .4 .4 .5 .4 .4 .5 .4 .4 .4 .4 .4 .5 .5 .4 .5 .4 .3 .3
.5 .6 .5 .8 .6 .5 .5 .5 .5 .6 .5 .5 .5 1.6 1.2 .6 .5 .4 .4 .5 .5 .5 .4 .5 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4
.3 .4 .5 .3 .6 .6 .6 .5 .6 .6 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .6 .7 .7 .5 .6 .4 .4 .4 .3
.3 .3 .3 .3 .3 .6 .8 .8 .9 .9 .5 .5 .4 .3 .3 .3 .3 .5 .6 .6 .7 .7 .8 .6 .6 1.0 1.0 1.0 1.0 .9 .7 .5 .4 .4 .4 .4
.3 .3 .3 .3 .2 .4 .9 .9 .9 1.0 .6 .5 .3 .2 .2 .2 .2 .7 .6 .4 .5 .7 .8 .7 .9 2.2 2.3 1.9 1.3 .8 .7 .6 .5 .4 .4 .4
.4 .4 .3 .3 .3 .2 .5 1.0 .7 .7 .5 .4 .3 .3 .3 .2 .5 .9 .5 .6 .8 .6 .6 .8 .8 .7 .6 .7 .6 .4 .3 .4 .3 .3 .6 .4
.4 .3 .3 .3 .4 .4 .4 .7 .8 .7 .6 .5 .4 .3 .3 .4 .9 1.3 1.0 1.3 1.1 1.0 .9 .5 .3 .9 .6 .7 .8 .5 .7 .5 .4 .3 .4 .4
.5 .5 .5 .4 .5 .4 .4 .5 .6 .6 1.0 .9 .8 .5 .5 .5 .5 .5 .7 .9 1.0 1.0 .7 .3 .7 .6 .5 .7 .8 .7 .8 .7 .6 .5 .6 .6
.4 .3 .3 .2 .3 .2 .2 .3 .3 .3 .6 .6 .4 .4 .4 .3 .2 .3 .3 .6 .7 .7 .3 .5 .8 .7 .6 .5 .6 .5 .6 .7 .6 .8 .6 .5
.4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .9 1.0 .4 .4 .4 .3 .2 .3 .3 .5 .4 .5 .4 .4 .4 .4 .4 .3 .3 .3 .6 .6 .4 .5 .5 .6
.4 .6 .4 .3 .4 .4 .4 .3 .3 .3 .4 1.0 .7 .5 .3 .3 .3 .3 .3 .5 .5 .4 .4 .3 .3 .3 .3 .3 .3 .5 .4 .4 .4 .4 .4 .4
.4 .3 .4 .4 .4 .3 .4 .3 .3 .3 .6 .7 .5 .4 .4 .4 .3 .3 .4 .4 .5 .3 .3 .3 .3 .3 .3 .3 .3 .4 .4 .5 .4 .4 .3 .4
.4 .3 .3 .4 .4 .3 .3 .4 .3 .3 .5 .4 .3 .4 .3 .4 .3 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .3 .4 .5
.4 .4 .5 .4 .4 .5 .5 .5 .5 .5 .6 .5 .4 .4 .4 .5 .4 .5 .5 .5 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .4 .5
.5 .6 .7 .6 .6 .6 .6 .6 .6 .5 .5 .8 .7 .5 .5 .6 .6 .6 .7 .6 .7 .7 .8 1.1 .7 .6 .7 .9 1.0 .8 .9 1.0 .8 .7 .5 .6
.7 .7 .7 .8 1.1 1.3 1.1 .9 .9 .7 .9 1.0 .8 .6 .7 .9 1.4 2.3 3.0 3.5 3.0 2.5 2.0 1.6 1.6 1.8 2.0 1.7 1.9 2.2 2.3 1.9 1.3 1.4 .9 .6
.9 .8 .9 .8 .8 1.0 1.1 1.1 1.3 .9 .7 .7 .9 .9 .9 1.1 1.1 1.3 1.7 2.1 2.1 2.1 2.4 2.3 2.0 2.1 2.2 2.0 1.7 1.4 1.3 1.3 1.3 1.5 1.1 .9

Figure 66. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

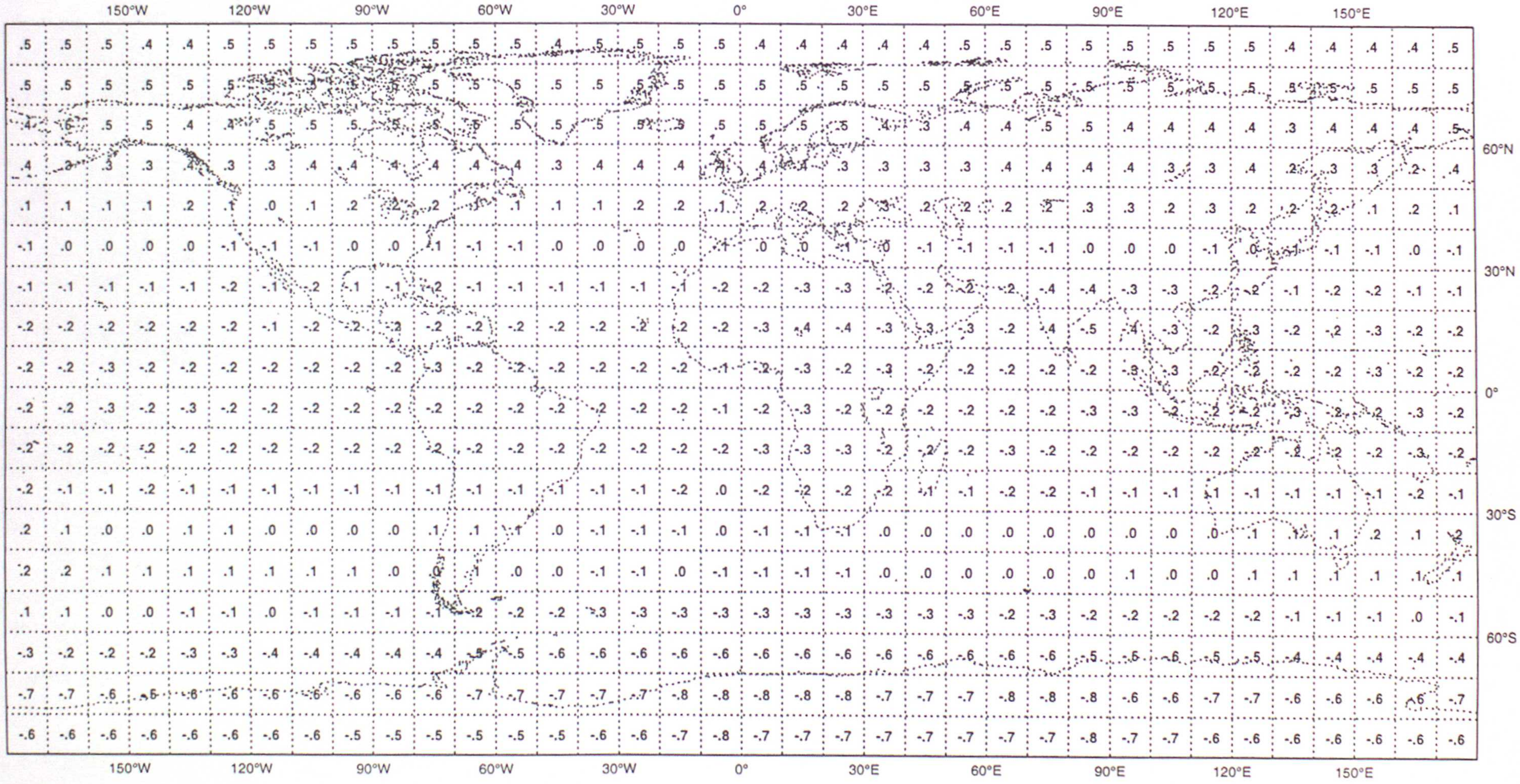

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N 30°N 0° 30°S 60°S
.5 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .5 .5 .5 .5 .4 .4 .4 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .4 .4 .5
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5
.4 .6 .5 .5 .4 .4 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .3 .4 .4 .5 .5 .4 .4 .4 .4 .3 .4 .4 .4 .5
.4 .3 .3 .3 .4 .3 .3 .4 .4 .4 .4 .4 .4 .3 .4 .4 .4 .4 .4 .4 .3 .3 .3 .3 .4 .4 .4 .4 .3 .3 .4 .2 .3 .3 .2 .4
.1 .1 .1 .1 .2 .1 .0 .1 .2 .2 .2 .1 .1 .1 .1 .2 .2 .1 .2 .2 .2 .3 .2 .2 .2 .2 .3 .3 .2 .3 .2 .2 .2 .1 .2 .1
-.1 .0 .0 .0 .0 -.1 -.1 -.1 .0 .0 .1 -.1 -.1 .0 .0 .0 .0 -.1 .0 .0 -.1 .0 -.1 -.1 -.1 -.1 .0 .0 .0 -.1 .0 -.1 -.1 -.1 .0 -.1
-.1 -.1 -.1 -.1 -.1 -.2 -.1 -.2 -.1 -.1 -.2 -.1 -.1 -.1 -.1 -.1 -.1 -.2 -.2 -.3 -.3 -.2 -.2 -.2 -.2 -.4 -.4 -.3 -.3 -.2 -.2 -.1 -.2 -.2 -.1 -.1
-.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.4 -.4 -.3 -.3 -.3 -.2 -.4 -.5 -.4 -.3 -.2 -.3 -.2 -.2 -.3 -.2 -.2
-.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.3 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.2 -.2 -.2 -.2 -.3 -.2 -.2
-.2 -.2 -.3 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.2 -.2 -.2 -.3 -.2 -.2 -.3 -.2
-.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.3 -.2 -.2 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.2
-.2 -.1 -.1 -.2 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.2 .0 -.2 -.2 -.2 -.2 -.1 -.1 -.2 -.2 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.1 -.2 -.1
.2 .1 .0 .0 .1 .1 .0 .0 .0 .0 .1 .1 .1 .0 -.1 -.1 -.1 .0 -.1 -.1 -.1 .0 .0 .0 .0 .0 .0 .0 .0 .0 .1 .1 .1 .2 .1 .2
.2 .2 .1 .1 .1 .1 .1 .1 .1 .0 .0 .1 .0 .0 -.1 -.1 .0 -.1 -.1 -.1 -.1 .0 .0 .0 .0 .0 .0 .1 .0 .0 .1 .1 .1 .1 .1 .1
.1 .1 .0 .0 -.1 -.1 .0 -.1 -.1 -.1 -.1 -.2 -.2 -.2 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.3 -.2 -.3 -.2 -.2 -.2 -.2 -.2 -.1 -.1 -.1 .0 -.1
-.3 -.2 -.2 -.2 -.3 -.3 -.4 -.4 -.4 -.4 -.4 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.5 -.5 -.6 -.5 -.5 -.4 -.4 -.4 -.4 -.4
-.7 -.7 -.6 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.7 -.7 -.7 -.8 -.8 -.8 -.6 -.6 -.7 -.7 -.6 -.6 -.6 -.6 -.7
-.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.5 -.5 -.5 -.5 -.5 -.5 -.6 -.6 -.7 -.8 -.7 -.7 -.7 -.7 -.7 -.7 -.7 -.7 -.8 -.7 -.7 -.6 -.6 -.6 -.6 -.6 -.6 -.6

Figure 67. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-7 (300 hPa)
NOAA17, using all observations

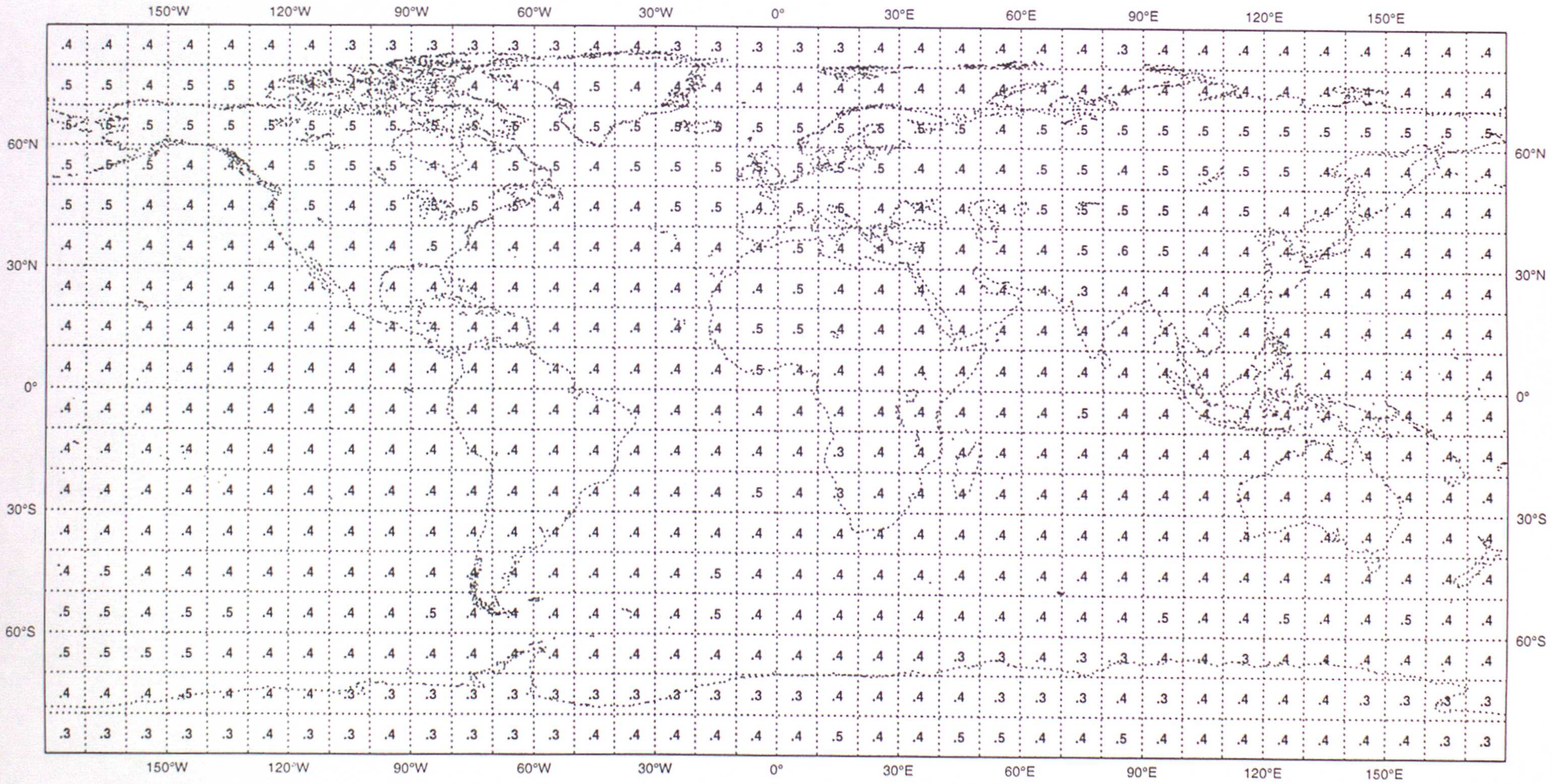

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

Figure 68. ATOVS MEAN O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

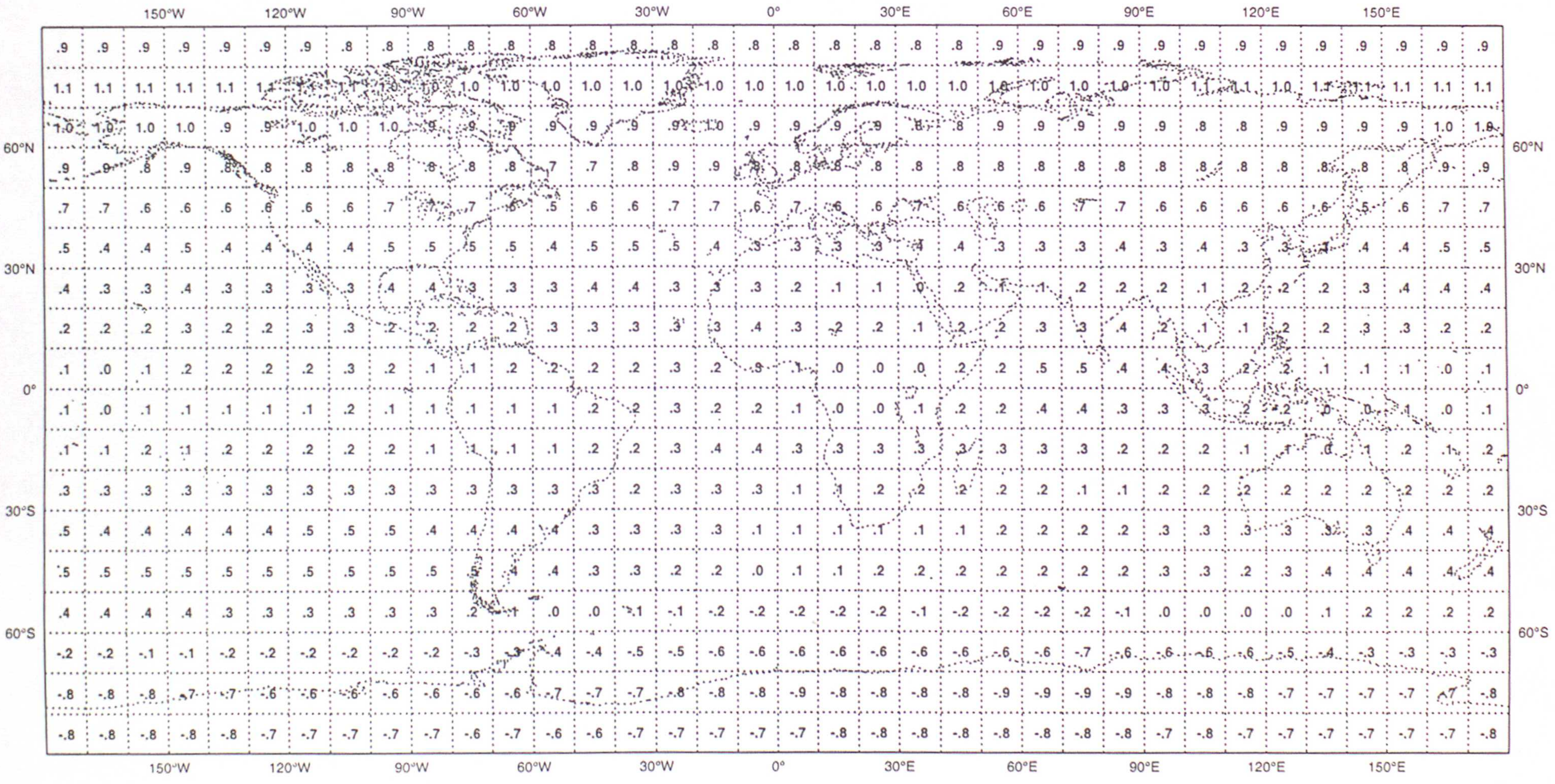

150°W 120°W 90°W 60°W 30°W 0° 30°E 60°E 90°E 120°E 150°E
60°N
30°N
0°
30°S
60°S
.9 .9 .9 .9 .9 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9 .9
1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.1 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.0 1.1 1.1 1.0 1.1 1.1 1.1 1.1 1.1
1.0 1.0 1.0 1.0 .9 .9 1.0 1.0 1.0 .9 .9 .9 .9 .9 .9 .9 1.0 .9 .9 .9 .9 .8 .8 .9 .9 .9 .9 .9 .8 .8 .9 .9 .9 .9 1.0 1.0
.9 .9 .8 .9 .8 .8 .8 .8 .8 .8 .8 .8 .7 .7 .8 .9 .9 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .8 .9 .9
.7 .7 .6 .6 .6 .6 .6 .6 .7 .7 .7 .6 .5 .6 .6 .7 .7 .6 .7 .6 .6 .7 .6 .6 .6 .7 .7 .6 .6 .6 .6 .6 .5 .6 .7 .7
.5 .4 .4 .5 .4 .4 .4 .4 .5 .5 .5 .5 .4 .5 .5 .5 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .3 .4 .3 .3 .4 .4 .4 .5 .5
.4 .3 .3 .4 .3 .3 .3 .3 .4 .4 .3 .3 .3 .4 .4 .3 .3 .3 .2 .1 .1 .0 .2 .1 .1 .2 .2 .2 .1 .2 .2 .2 .3 .4 .4 .4
.2 .2 .2 .3 .2 .2 .3 .3 .2 .2 .2 .2 .3 .3 .3 .3 .3 .4 .3 .2 .2 .1 .2 .2 .3 .3 .4 .2 .1 .1 .2 .2 .3 .3 .2 .2
.1 .0 .1 .2 .2 .2 .2 .3 .2 .1 .1 .2 .2 .2 .2 .3 .2 .3 .1 .0 .0 .0 .2 .2 .5 .5 .4 .4 .3 .2 .2 .1 .1 .1 .0 .1
.1 .0 .1 .1 .1 .1 .1 .2 .1 .1 .1 .1 .1 .2 .2 .3 .2 .2 .1 .0 .0 .1 .2 .2 .4 .4 .3 .3 .3 .2 .2 .0 .0 .1 .0 .1
.1 .1 .2 .1 .2 .2 .2 .2 .2 .1 .1 .1 .1 .2 .2 .3 .4 .4 .3 .3 .3 .3 .3 .3 .3 .3 .2 .2 .2 .1 .1 .0 .1 .2 .1 .2
.3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .3 .2 .3 .3 .3 .1 .1 .2 .2 .2 .2 .2 .1 .1 .2 .2 .2 .2 .2 .2 .2 .2 .2
.5 .4 .4 .4 .4 .4 .5 .5 .5 .4 .4 .4 .4 .3 .3 .3 .3 .1 .1 .1 .1 .1 .1 .2 .2 .2 .2 .3 .3 .3 .3 .3 .3 .4 .4 .4
.5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .5 .4 .4 .3 .3 .2 .2 .0 .1 .1 .2 .2 .2 .2 .2 .2 .2 .3 .3 .2 .3 .4 .4 .4 .4 .4
.4 .4 .4 .4 .3 .3 .3 .3 .3 .3 .2 .1 .0 .0 .1 -.1 -.2 -.2 -.2 -.2 -.2 -.1 -.2 -.2 -.2 -.2 -.1 .0 .0 .0 .0 .1 .2 .2 .2 .2
-.2 -.2 -.1 -.1 -.2 -.2 -.2 -.2 -.2 -.2 -.3 -.3 -.4 -.4 -.5 -.5 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.6 -.6 -.6 -.6 -.5 -.4 -.3 -.3 -.3 -.3
-.8 -.8 -.8 -.7 -.7 -.6 -.6 -.6 -.6 -.6 -.6 -.6 -.7 -.7 -.7 -.8 -.8 -.8 -.9 -.8 -.8 -.8 -.8 -.9 -.9 -.9 -.9 -.8 -.8 -.8 -.7 -.7 -.7 -.7 -.7 -.8
-.8 -.8 -.8 -.8 -.8 -.7 -.7 -.7 -.7 -.7 -.6 -.7 -.6 -.6 -.7 -.7 -.7 -.7 -.7 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.8 -.7 -.8 -.7 -.7 -.7 -.7 -.7 -.7 -.8

Figure 69. ATOVS SD O-B brightness temperature differences (deg C). JULY 2003
Channel: AMSUA-9 (100 hPa)
NOAA17, using all observations

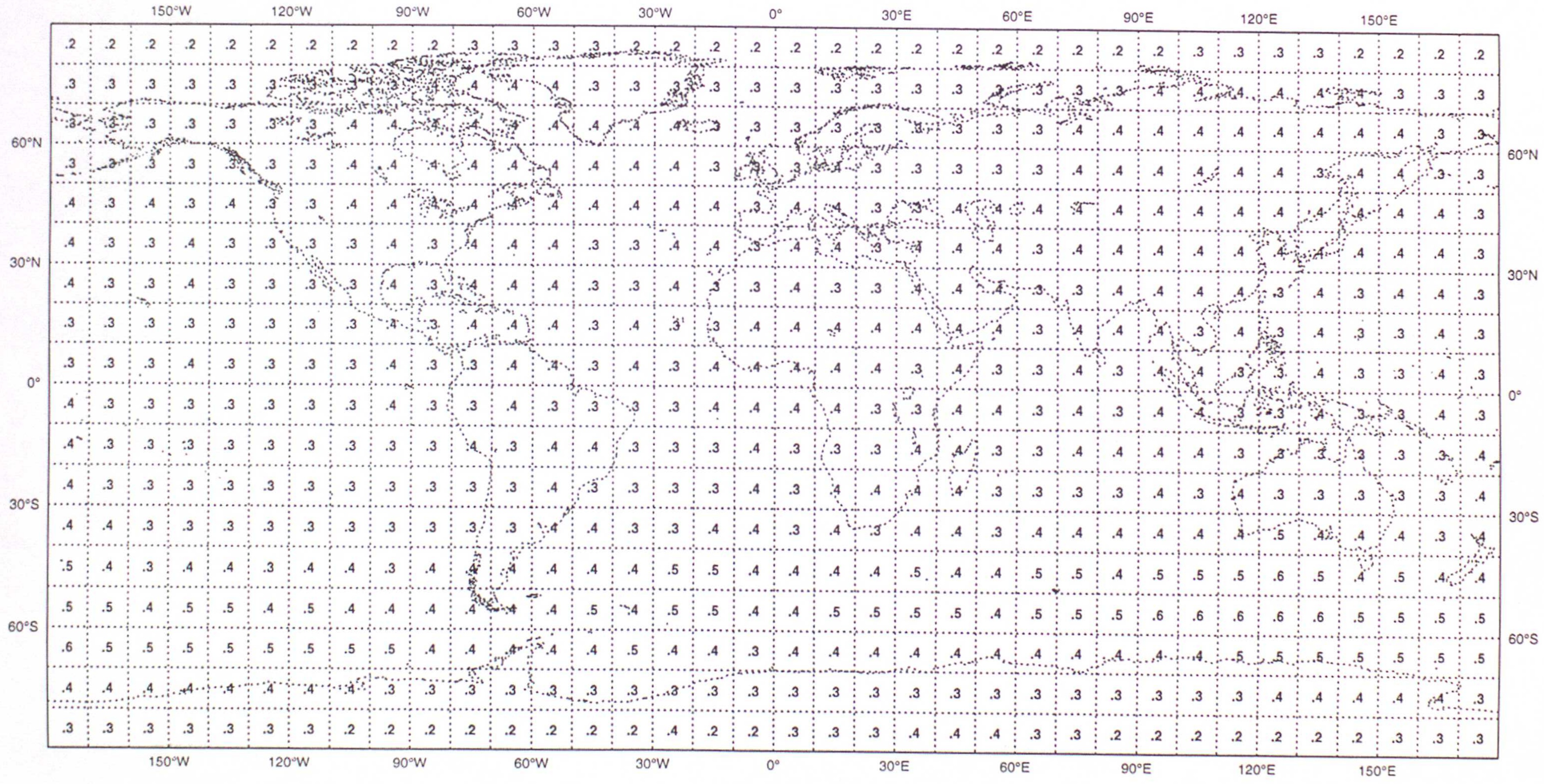

150°W
120°W
90°W
60°W
30°W
0°
30°E
60°E
90°E
120°E
150°E
60°N
30°N
0°
30°S
60°S

TABLE 8

MONTHLY MONITORING OF MARINE SURFACE OBSERVATIONS (COSNA)
DATA TYPE:- DRIFTER
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period :One calendar month.

Data monitored :Reports from each unique identifier for drifting buoy.

Area monitored :10°N - 80°N, 85°W - 0°W

Standard of comparison :Background field from UKMO global model.

Position :Average latitude and longitude for period.

Observation times :All hours combined.

Elements monitored
:Mean sea-level pressure (hPa)
:Wind speed (m s^{-1})
:Wind direction (degrees)

Parameters monitored

:NOBS :Number of observations received excluding duplicates.

:NGE :Number of observations with gross errors.

:PGE :Percentage of observations with gross errors.

:SD :SD of difference of observations from background values excluding those with gross errors.

:BIAS :Mean difference of observations from background values excluding those with gross errors.
N.B. A positive bias indicates the wind observation is veered to the background

:RMS :Root Mean Square difference of observations from background values excluding those with gross errors

GROSS ERROR LIMITS
:15 hPa (pressure)
:25 m s^{-1} (Vector Wind)

N.B. Observations of wind direction are only included in the wind direction statistics if the observed OR background wind speed > 5 m s^{-1}

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
MEAN SEA LEVEL PRESSURE									
13599	17.3	-30.6	P	607	0	1	0.5	0.6	0.8
13600	16.3	-25.4	P	845	0	31	0.6	-0.2	0.6
13602	18.2	-28.8	P	132	0	2	0.5	0.1	0.5
13604	14.9	-26.3	P	159	1	3	0.6	0.1	0.6
41502	10.9	-56.6	P	2	0	0	0.4	0.1	0.4
41503	21.8	-73.3	P	805	0	26	0.5	-1.7	1.7
41504	10.1	-50.7	P	3	0	0	1.4	0.4	1.5
41505	15.1	-50.4	P	3	0	100	0.5	-8.5	8.5
41506	15.0	-54.7	P	1	0	0	0.0	1.2	1.2
41520	10.2	-46.6	P	4	0	0	0.6	0.9	1.1
41521	15.9	-45.8	P	1	0	0	0.0	-3.5	3.5
41522	21.4	-56.2	P	664	0	1	0.6	-1.6	1.7
41532	22.8	-70.5	P	690	0	1	0.5	1.0	1.1
41534	27.6	-61.0	P	691	0	1	0.5	0.6	0.8
41537	27.8	-58.5	P	672	0	1	0.7	1.1	1.3
41630	29.5	-75.0	P	449	0	1	0.5	1.0	1.1
41631	25.1	-74.2	P	422	0	1	0.5	0.8	0.9
41643	27.3	-73.0	P	654	100	100			
41645	24.5	-73.3	P	480	0	1	0.5	1.1	1.3
41646	23.1	-70.2	P	427	0	1	0.5	0.5	0.7
41647	21.4	-68.4	P	439	0	1	0.5	0.8	0.9
41649	16.3	-61.1	P	594	0	100	0.4	-5.3	5.3
41651	25.4	-67.3	P	542	100	100			
41655	25.0	-71.5	P	453	0	1	0.5	0.9	1.0
41658	44.8	-19.6	P	661	0	1	0.5	-1.3	1.4
41659	29.3	-34.2	P	708	0	1	0.4	0.0	0.4
41666	32.9	-48.5	P	707	0	1	0.5	0.8	1.0
44551	42.7	-56.1	P	635	0	3	0.6	0.2	0.6
44585	42.4	-69.4	P	524	0	33	0.6	1.0	1.2
44601	33.7	-47.8	P	303	0	7	0.4	-0.9	1.0
44603	55.8	-30.4	P	710	0	6	0.8	-0.2	0.8
44605	53.3	-42.6	P	735	0	5	0.8	-0.4	0.9
44606	33.6	-54.7	P	744	0	5	0.6	0.2	0.6
44608	36.3	-35.4	P	736	0	5	0.4	-0.1	0.4
44609	56.0	-18.0	P	968	0	30	0.4	-1.2	1.3
44610	41.8	-33.3	P	1334	0	48	0.5	-0.3	0.5
44611	56.3	-24.4	P	720	0	5	0.5	-0.4	0.6
44613	53.8	-26.2	P	698	0	5	1.1	-0.7	1.3
44614	57.5	-47.1	P	1291	0	47	0.5	-0.4	0.7
44615	44.5	-33.8	P	1095	0	38	0.5	-0.6	0.8
44620	41.4	-26.4	P	802	0	15	0.4	0.0	0.4
44621	58.3	-39.0	P	711	0	5	0.7	0.0	0.7
44622	48.6	-28.8	P	707	0	4	0.5	-0.1	0.5
44623	37.6	-72.4	P	742	0	5	0.7	0.7	1.0
44626	39.5	-71.8	P	729	0	4	0.6	0.5	0.8
44628	40.8	-43.9	P	738	0	6	1.0	-0.4	1.1
44630	37.6	-60.7	P	739	0	4	0.6	1.0	1.1
44723	40.4	-19.6	P	709	0	5	0.5	-0.2	0.6
44726	64.5	-54.4	P	1620	0	55	0.6	-0.2	0.6
44730	55.4	-29.6	P	1626	0	57	0.7	-0.7	1.0
44741	37.8	-72.8	P	747	0	4	0.7	0.2	0.7
44764	58.7	-21.5	P	2058	0	67	0.6	-0.6	0.8
44767	62.2	-10.3	P	715	0	4	0.6	-0.4	0.7
44774	42.6	-11.2	P	279	0	18	0.4	0.0	0.4
44776	51.7	-12.9	P	360	0	26	0.5	0.1	0.5
44777	40.1	-25.7	P	404	0	22	0.4	-0.1	0.4
44778	42.3	-35.6	P	486	0	28	0.4	0.3	0.5
44779	52.2	-25.8	P	497	0	34	0.7	0.0	0.7
44780	56.4	-51.0	P	742	0	46	0.5	-0.3	0.6
47554	73.1	-76.3	P	508	0	32	0.8	-0.1	0.8

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
48589	68.0	-29.9	P	284	0	10	2.7	1.0	2.9
62505	63.9	-16.4	P	73	0	11	0.7	0.4	0.8
62508	43.6	-2.2	P	105	0	10	0.5	-0.8	0.9
62513	34.9	-21.4	P	720	0	4	0.4	0.2	0.5
62514	30.6	-22.9	P	714	0	4	0.6	0.1	0.6
62515	19.5	-38.9	P	753	0	5	0.4	0.0	0.4
62517	28.4	-25.7	P	718	0	4	0.4	-0.5	0.6
62519	47.0	-4.1	P	1099	0	41	0.6	-0.6	0.8
62551	43.6	-23.9	P	705	0	4	0.6	0.3	0.6
62552	37.6	-21.8	P	720	0	4	0.4	0.2	0.5
62553	36.5	-18.2	P	723	0	4	0.4	0.0	0.4
62554	41.1	-19.0	P	714	0	4	0.5	-0.2	0.5
62597	35.7	-14.7	P	598	0	4	0.4	0.0	0.4
62599	61.3	-8.8	P	773	0	49	0.6	0.1	0.6
62600	51.6	-7.0	P	492	0	34	0.4	0.1	0.4
62711	49.3	-49.0	P	686	0	5	0.7	0.1	0.7
62712	55.1	-43.3	P	756	0	9	0.7	-0.1	0.7
62801	38.7	-24.6	P	1185	0	43	0.4	0.5	0.6
62802	38.8	-19.4	P	718	0	4	0.4	-0.2	0.5
62803	45.5	-11.9	P	684	0	5	0.8	-0.2	0.8
62804	46.2	-10.2	P	727	0	5	0.5	-0.6	0.8
805789	33.5	-65.2	P	1	0	0	0.0	1.0	1.0
WIND SPEED									
13599	17.3	-30.6	SPEED	601	0	100	0.9	-1.3	1.6
13600	16.3	-25.4	SPEED	826	0	100	1.4	-0.5	1.5
13602	18.2	-28.8	SPEED	125	0	100	1.1	-0.5	1.2
13604	14.9	-26.3	SPEED	156	0	100	1.1	-0.2	1.1
41522	21.4	-56.2	SPEED	664	0	100	1.2	0.0	1.2
41532	22.8	-70.5	SPEED	346	0	100	1.5	-0.7	1.7
41534	27.6	-61.0	SPEED	601	6	100	5.4	1.2	5.5
41537	27.8	-58.5	SPEED	671	0	100	2.6	0.0	2.6
41630	29.5	-75.0	SPEED	441	0	100	1.1	-0.9	1.4
41631	25.1	-74.2	SPEED	399	0	100	1.4	-0.8	1.6
41645	24.5	-73.3	SPEED	463	0	100	1.6	-1.0	1.8
41646	23.1	-70.2	SPEED	414	0	100	1.1	-0.8	1.3
41647	21.4	-68.4	SPEED	433	0	100	1.2	-0.5	1.3
41655	25.0	-71.5	SPEED	440	0	100	1.4	0.0	1.4
44551	42.7	-56.1	SPEED	469	0	100	2.0	-0.7	2.1
44585	42.4	-69.4	SPEED	12	0	100	1.9	-0.8	2.1
44601	33.7	-47.8	SPEED	232	0	100	2.7	-4.9	5.6
44615	44.5	-33.8	SPEED	1090	0	100	1.9	0.5	1.9
44620	41.4	-26.4	SPEED	797	0	100	1.9	0.3	1.9
62711	49.3	-49.0	SPEED	676	0	100	2.2	0.6	2.2
805789	33.5	-65.2	SPEED	1	0	100	0.0	1.8	1.8
WIND DIRECTION									
13599	17.3	-30.6	DIRN.	447	0	0	13.3	-23.3	26.8
13600	16.3	-25.4	DIRN.	379	0	0	16.5	35.9	39.5
13602	18.2	-28.8	DIRN.	116	0	0	8.9	35.1	36.2
13604	14.9	-26.3	DIRN.	33	0	0	11.7	-4.7	12.6
41522	21.4	-56.2	DIRN.	648	0	0	9.7	-14.7	17.6
41532	22.8	-70.5	DIRN.	339	0	0	9.2	41.8	42.8
41534	27.6	-61.0	DIRN.	314	12	0	13.1	7.5	15.1
41537	27.8	-58.5	DIRN.	246	0	0	14.1	-34.6	37.4
41630	29.5	-75.0	DIRN.	120	0	0	24.2	-3.5	24.4
41631	25.1	-74.2	DIRN.	361	0	0	17.7	1.6	17.7
41645	24.5	-73.3	DIRN.	409	0	0	21.5	17.8	27.9
41646	23.1	-70.2	DIRN.	412	0	0	24.7	9.7	26.6
41647	21.4	-68.4	DIRN.	425	0	0	15.3	5.2	16.2
41655	25.0	-71.5	DIRN.	427	0	0	22.6	2.3	22.7
44551	42.7	-56.1	DIRN.	225	0	0	35.1	1.8	35.2

IDENTIFIER	LAT.	LONG.	ELEM	NOBS	PGE	%REJ	SD	BIAS	RMS
44585	42.4	-69.4	DIRN.	6	0	0	43.9	35.7	56.6
44615	44.5	-33.8	DIRN.	704	0	0	22.0	4.0	22.4
44620	41.4	-26.4	DIRN.	386	0	0	12.9	-6.1	14.2
62711	49.3	-49.0	DIRN.	389	0	0	22.7	-3.0	22.9
805789	33.5	-65.2	DIRN.	1	0	0	0.0	-16.6	16.6

TABLE 9

MONTHLY MONITORING OF AIRCRAFT OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Statistics for each airline carrier.
Area monitored		:40°N - 70°N, 60°W - 0°W.
Standard of comparison		:Background field from UKMO global model.
Observation times		:All hours combined.
Level(s) monitored		:300.0 - 150.0 hPa
Elements monitored		:TEMP in °C ; WIND in m s^{-1}
Parameters monitored	:N REP.	:Number of observations received excluding duplicates.
	:PG	:Percentage of observations with gross errors.
	:PR	:Percentage of observations rejected by quality control including rejections from the duplicate check.
	:PC	:Percentage of observations with calm winds.
	:RMS	:Root Mean Square difference of observations from background values excluding those with gross errors in Temperature & vector wind.
	:BIAS	:Mean difference of observations from background values excluding those with gross errors in Temperature & vector wind.
GROSS ERROR LIMITS	:10.0 °C ; 60 m s^{-1} Vector Wind	
SELECTION CRITERIA	:N REP ≥ 20	

NB : All American ACARS data are grouped together and statistics are shown at the bottom of the table as "US ACARS". All ADS reports are similarly grouped together.

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
AAL	654	1	10	1.9	0.0	580	0	10	0	7.4	0.2
ACA	1404	0	3	1.8	-0.3	1335	0	2	0	6.1	0.5
AEA	148	0	8	1.6	0.7	87	0	10	0	6.8	-0.7
AEL	198	0	13	1.9	-0.3	183	0	13	0	6.1	0.7
AEW	84	0	1	1.8	-0.7	83	1	8	0	9.6	0.8
AFL	364	1	4	2.0	0.3	343	0	4	0	7.1	0.2
AFR	726	1	6	1.6	-0.1	665	0	7	0	7.0	0.3
AIS	179	1	12	1.5	-0.5	178	0	15	0	7.8	-0.4
AJM	250	0	2	1.4	-0.2	236	0	2	0	5.5	0.5
AMM	78	0	3	1.4	0.2	70	0	10	0	8.4	1.0
AMT	42	0	7	1.5	0.3	41	0	7	0	9.8	1.4
AMX	178	1	3	1.7	0.1	149	1	7	0	8.5	0.4
AZA	368	2	6	1.5	-0.2	345	0	7	0	7.2	0.2
BAF	31	0	3	2.3	-0.1	33	0	0	0	4.6	-0.1
BAL	115	0	9	1.0	0.2	111	0	10	0	7.4	0.1
BAW	415	0	10	2.0	-0.7	409	0	9	0	5.8	0.3
BPA	114	1	11	1.0	0.0	111	0	12	0	6.9	0.0
BSK	49	10	14	1.8	-0.2	51	0	4	0	6.9	1.6
BWA	73	1	1	1.6	-0.1	57	0	0	0	5.0	0.6
CFC	46	0	4	1.7	-0.1	47	0	4	0	5.0	0.7
CFG	363	0	4	1.5	-0.6	335	0	5	0	6.6	0.2
CGH	23	0	0	0.9	-0.3	20	0	0	0	3.9	1.2
CKS	247	0	8	2.0	0.1	238	0	7	0	9.0	-0.6
CLX	243	1	2	1.9	-0.6	220	0	2	0	7.1	-0.1
COA	104	0	47	1.3	0.2	83	0	55	0	7.8	1.0
CRL	216	1	1	1.3	0.2	190	0	1	0	6.1	0.2
CSA	28	0	4	2.2	-0.7	30	0	0	0	5.4	1.1
CUB	70	4	4	1.4	-0.1	68	0	4	0	9.1	0.2
DAB	49	0	12	1.2	-0.5	47	0	13	0	3.4	0.6
DAI	45	0	2	0.9	0.2	41	0	2	0	2.4	0.5
DAL	1124	0	6	1.7	-0.5	1037	0	8	0	7.4	0.4
DBR	33	0	9	2.1	-0.9	31	0	3	0	6.2	0.0
DCE	119	3	8	1.2	-0.6	112	1	10	0	6.5	0.0
DCS	20	5	10	1.9	-0.2	21	0	14	0	11.1	3.0
DHL	125	1	100	6.5	-6.4	121	1	100	0	16.0	4.0
DLH	604	0	12	1.6	-0.2	605	0	14	0	7.5	0.3
EDW	59	0	3	1.2	-0.2	54	0	4	0	5.0	1.6
EEZ	49	0	8	1.7	0.0	51	0	8	0	6.0	0.8
EIA	247	1	19	2.4	1.1	241	1	100	0	19.7	5.9
ELY	317	1	3	1.4	0.1	292	0	4	0	6.6	0.1
ETH	20	0	20	2.5	-0.4	21	0	14	0	5.4	0.8
FDX	740	1	31	1.6	0.1	748	0	29	0	7.3	0.5
FIN	333	0	4	1.7	0.1	306	0	3	0	6.6	0.6
GAF	49	0	6	1.9	-0.6	48	0	6	0	6.4	1.2
GCO	323	0	7	1.6	-0.1	329	1	100	0	10.7	1.3
GRL	108	0	0	1.3	0.0	93	0	2	0	6.0	1.7
GTI	179	6	25	2.8	0.7	175	0	14	0	8.4	0.1
HLN	28	0	4	1.4	-0.8	26	0	0	0	5.7	1.2
IBE	754	1	7	1.3	0.3	593	0	9	0	6.2	0.0
ICE	752	1	3	1.7	-0.1	690	0	3	0	6.7	0.9
IWD	53	0	2	1.2	-0.3	29	0	3	0	5.6	0.5
KLM	854	0	3	1.8	0.0	816	0	2	0	6.1	0.4
LAN	26	0	12	2.3	1.1	25	0	16	0	13.6	-3.0
LDI	237	0	4	1.4	-0.7	202	0	4	0	7.3	0.6
LOT	112	0	4	1.8	-1.1	101	0	7	0	6.9	0.3
LTU	550	0	5	1.5	-0.2	478	0	6	0	6.7	0.6
LXR	46	0	4	1.7	-0.3	48	0	4	0	5.2	1.2
MON	71	0	0	1.3	-0.3	61	0	0	0	5.4	0.5
MPD	86	0	8	2.9	1.6	59	0	2	0	6.7	1.5

		TEMPERATURE					WIND				
IDENT.	N.REP.	PG	PR	RMS	BIAS	N.REP.	PG	PR	PC	RMS	BIAS
MPH	399	0	4	1.8	-0.9	380	0	4	0	7.2	0.0
MYT	181	1	4	1.6	-0.3	182	0	4	0	6.0	0.0
NCA	34	0	0	1.8	0.0	29	0	0	0	6.1	1.0
NWA	3057	1	4	1.9	0.0	3026	0	4	0	7.6	0.4
OAE	141	0	9	1.7	-0.5	137	0	42	0	18.2	5.6
OOM	157	0	8	2.8	2.2	148	0	5	0	6.2	0.1
PAC	259	0	6	2.0	0.4	255	0	6	0	8.1	0.5
RAM	273	0	4	1.7	0.5	203	0	100	0	9.2	0.3
RCH	200	1	22	2.6	0.0	191	0	100	0	10.5	1.3
RRR	26	8	12	1.4	0.0	24	0	8	0	4.8	0.0
RZO	287	0	4	1.2	-0.5	257	0	6	0	8.7	0.5
SEU	61	0	3	1.2	0.0	62	0	5	0	5.9	1.1
SLR	138	0	8	1.6	0.0	138	0	10	0	8.2	-0.1
SSV	29	0	0	1.5	-0.7	29	0	0	0	5.4	0.3
TAP	152	0	5	1.4	-0.4	113	0	4	0	6.6	0.9
THT	23	0	9	3.0	0.2	22	0	9	0	7.7	-0.9
TSC	231	1	5	1.8	-0.1	204	0	5	0	7.9	1.6
UAL	178	0	41	2.2	-0.8	169	0	44	0	9.0	1.9
UPS	1106	1	49	1.5	-0.1	1068	0	49	0	7.5	0.4
VIR	147	1	6	1.7	-0.3	152	0	4	0	7.6	-0.1
WOA	243	1	4	1.3	0.2	239	0	9	0	9.5	2.1
EU	18730	0	16	1.3	0.2	18730	0	16	0	4.3	0.3
KL	237	0	6	1.6	0.3	235	0	6	0	6.4	0.2
N	625	1	5	1.9	0.4	607	0	5	0	6.4	0.9
US ACARS	17350	8	42	1.5	0.1	17350	0	33	0	5.2	0.5

TABLE 10

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP3	12	Z	100	9	0	22.5	40.2	33.3
DBBH	00	Z	100	21	0	7.9	34.0	33.1
DBBH	12	Z	100	26	0	16.9	37.3	33.2
DBLK	12	Z	100	15	0	17.9	35.1	30.2
EBUQ	12	Z	100	23	0	12.9	14.2	-6.0
ELML7	00	Z	100	7	0	14.2	21.9	16.7
ELML7	12	Z	100	10	0	17.7	21.0	11.4
FNPH	00	Z	100	3	0	13.9	31.0	-27.7
FNPH	12	Z	100	3	0	3.6	21.3	-21.0
FNRS	00	Z	100	6	0	18.6	26.1	-18.3
FNRS	12	Z	100	7	0	11.2	12.9	-6.4
FQFL	00	Z	100	5	0	15.6	28.0	-23.2
FQFL	12	Z	100	4	0	8.5	25.4	-24.0
KHRH	00	Z	100	11	0	92.1	119.5	-76.1
KHRH	12	Z	100	7	0	82.2	125.5	-94.9
LDWR	00	Z	100	28	0	23.4	23.5	-2.6
LDWR	12	Z	100	30	0	13.0	16.3	-9.8
OXVH2	00	Z	100	6	0	70.6	73.2	-19.5
OXVH2	12	Z	100	3	0	11.8	26.2	23.3
OXYH2	00	Z	100	6	0	7.6	14.0	11.8
OXYH2	12	Z	100	6	0	10.4	23.3	20.8
SHIPCK	00	Z	100	3	0	8.3	9.0	3.3
SHIPCK	12	Z	100	1	0	0.0	32.0	32.0
V2XM	00	Z	100	3	0	14.9	22.6	17.0
V2XM	12	Z	100	4	0	21.7	25.2	12.8
WPKD	00	Z	100	8	0	6.4	6.4	0.0
WPKD	12	Z	100	6	0	5.3	5.3	0.5
ZCBP6	00	Z	100	3	0	9.9	35.4	34.0
ZCBP6	12	Z	100	7	0	18.8	40.4	35.7
03953	00	Z	100	29	0	14.4	15.8	6.6
03953	12	Z	100	31	0	11.2	11.5	2.8
04018	00	Z	100	29	0	9.3	15.9	13.0
04018	12	Z	100	31	0	22.7	30.0	19.5
04220	00	Z	100	28	0	9.5	16.9	14.0
04220	12	Z	100	30	0	40.0	41.1	9.5
04270	00	Z	100	29	0	14.1	20.0	14.1
04270	12	Z	100	30	0	8.0	18.8	17.0
04339	00	Z	100	29	0	8.5	17.4	15.1
04339	12	Z	100	29	0	6.8	16.3	14.9
04360	00	Z	100	29	0	8.7	24.4	22.8
04360	12	Z	100	31	0	8.3	20.2	18.4
08001	00	Z	100	22	0	21.3	26.7	-16.0
08001	12	Z	100	26	0	22.5	27.1	-15.2
08508	12	Z	100	26	0	10.9	12.2	5.5
08522	12	Z	100	27	0	6.6	6.6	-1.0
08594	12	Z	100	15	0	13.5	19.6	-14.1
71600	00	Z	100	29	0	26.2	26.3	1.7
71600	12	Z	100	31	0	12.3	12.4	-2.0
72201	00	Z	100	29	0	11.2	28.0	25.7
72201	12	Z	100	31	0	11.4	38.2	36.5
72402	00	Z	100	26	0	18.1	42.5	38.4
72402	12	Z	100	31	0	21.9	52.8	48.0
74494	00	Z	100	25	0	10.3	15.9	12.1
74494	12	Z	100	28	0	14.5	14.5	-1.0
78016	00	Z	100	29	0	11.4	19.2	15.4
78016	12	Z	100	31	0	13.5	20.6	15.6

TABLE 11

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures:

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:GEOPOTENTIAL HEIGHT in metres
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:SD	:SD of difference of observations from background values at level shown excluding those with gross errors.
	:BIAS	:Mean difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.1

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	SD	RMS	BIAS
DASAP3	12	Z	500	10	0	14.2	21.5	16.1
DBBH	00	Z	500	21	0	7.5	17.9	16.2
DBBH	12	Z	500	26	0	11.1	16.1	11.7
DBLK	12	Z	500	16	0	10.1	21.5	18.9
EBUQ	12	Z	500	23	0	10.6	12.8	-7.0
ELML7	00	Z	500	8	0	4.5	5.6	-3.3
ELML7	12	Z	500	10	0	7.8	8.9	-4.3
FNPH	00	Z	500	4	0	5.6	17.0	-16.0
FNPH	12	Z	500	3	0	6.9	8.8	-5.3
FNRS	00	Z	500	6	0	6.2	20.0	-19.0
FNRS	12	Z	500	8	0	4.4	11.5	-10.6
FQFL	00	Z	500	5	0	3.2	14.4	-14.0
FQFL	12	Z	500	4	1	8.3	10.1	-5.8
KHRH	00	Z	500	8	3	63.5	75.7	-41.1
KHRH	12	Z	500	5	3	66.2	89.8	-60.6
LDWR	00	Z	500	29	0	17.5	17.5	-1.2
LDWR	12	Z	500	30	0	9.6	10.1	-3.2
OXVH2	00	Z	500	6	0	39.3	39.4	1.0
OXVH2	12	Z	500	3	0	6.6	21.4	20.3
OXYH2	00	Z	500	6	0	12.3	15.4	9.2
OXYH2	12	Z	500	6	0	6.7	11.1	8.8
SHIPCK	00	Z	500	5	0	11.9	12.4	3.4
SHIPCK	12	Z	500	1	0	0.0	5.0	5.0
V2XM	00	Z	500	5	0	11.3	12.8	6.0
V2XM	12	Z	500	5	0	5.4	11.5	10.2
WPKD	00	Z	500	8	0	3.9	4.0	-0.9
WPKD	12	Z	500	7	0	5.3	5.8	-2.3
ZCBP6	00	Z	500	5	0	19.8	38.0	32.4
ZCBP6	12	Z	500	7	0	19.2	28.0	20.4
03953	00	Z	500	29	0	7.3	7.5	1.5
03953	12	Z	500	31	0	7.5	7.6	1.1
04018	00	Z	500	29	0	9.5	17.9	15.1
04018	12	Z	500	31	0	10.3	17.5	14.2
04220	00	Z	500	28	0	9.3	16.2	13.3
04220	12	Z	500	30	0	9.3	15.2	12.0
04270	00	Z	500	29	0	8.7	13.3	10.1
04270	12	Z	500	30	0	9.5	18.4	15.8
04339	00	Z	500	29	0	7.5	17.3	15.6
04339	12	Z	500	30	0	7.5	15.6	13.6
04360	00	Z	500	29	0	7.6	16.0	14.1
04360	12	Z	500	31	0	7.6	13.0	10.5
08001	00	Z	500	24	0	14.2	14.9	-4.6
08001	12	Z	500	30	0	9.0	10.9	-6.2
08508	12	Z	500	27	0	6.6	6.7	-1.4
08522	12	Z	500	28	0	6.8	6.9	-1.3
08594	12	Z	500	20	1	7.7	12.7	-10.1
71600	00	Z	500	29	0	6.5	7.2	-3.1
71600	12	Z	500	31	0	6.8	7.0	-1.8
72201	00	Z	500	29	0	4.2	4.2	0.4
72201	12	Z	500	31	0	5.5	5.7	1.6
72402	00	Z	500	27	0	7.4	7.4	0.1
72402	12	Z	500	31	0	8.9	9.3	2.5
74494	00	Z	500	27	0	7.2	7.4	-1.4
74494	12	Z	500	30	0	9.6	10.0	-2.8
78016	00	Z	500	29	0	7.4	9.1	5.4
78016	12	Z	500	31	0	7.9	15.8	13.7

TABLE 12

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:100 hPa.
Element monitored		:VECTOR WIND in m s^{-1}
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS	:Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP3	12	V	100	7	0	0	3.2	-0.3	-0.3
DBBH	00	V	100	21	0	0	2.8	-0.1	-0.6
DBBH	12	V	100	26	0	0	2.3	0.3	0.2
DBLK	12	V	100	14	0	0	2.2	-0.1	-0.2
EBUQ	12	V	100	21	0	0	6.5	-0.9	1.1
ELML7	00	V	100	7	0	0	7.3	-3.2	-0.1
ELML7	12	V	100	9	0	0	4.6	1.2	0.3
FNPH	00	V	100	4	0	0	5.3	-1.6	1.5
FNPH	12	V	100	3	0	0	4.2	-2.6	2.0
FNRS	00	V	100	6	0	0	3.3	0.4	-0.7
FNRS	12	V	100	7	0	0	3.2	-2.0	0.2
FQFL	00	V	100	5	0	0	2.4	-1.5	-0.2
FQFL	12	V	100	4	0	0	3.0	1.2	-0.2
KHRH	00	V	100	10	0	0	3.2	-0.6	-0.9
KHRH	12	V	100	6	0	0	5.3	-1.0	0.3
LDWR	00	V	100	28	0	0	2.1	0.1	0.3
LDWR	12	V	100	30	0	0	1.9	0.0	0.2
OXVH2	00	V	100	6	0	0	2.3	0.3	-0.1
OXVH2	12	V	100	3	0	0	2.3	-1.1	-0.9
OXYH2	00	V	100	4	0	0	5.0	2.0	-0.2
OXYH2	12	V	100	2	0	0	6.7	-3.1	4.7
SHIPCK	00	V	100	1	0	0	3.1	-3.0	0.8
V2XM	00	V	100	2	0	0	5.4	0.5	-5.0
V2XM	12	V	100	3	0	0	1.8	1.0	1.0
WPKD	00	V	100	7	0	0	4.8	-0.4	0.3
WPKD	12	V	100	5	0	0	2.4	0.5	0.6
ZCBP6	00	V	100	1	0	0	8.8	5.7	-6.7
ZCBP6	12	V	100	7	0	0	4.4	2.8	1.6
03953	00	V	100	29	0	0	2.7	0.2	0.5
03953	12	V	100	31	0	0	2.3	0.5	0.0
04018	00	V	100	29	0	0	2.3	0.1	0.4
04018	12	V	100	31	0	0	1.5	0.4	-0.1
04220	00	V	100	28	0	0	2.2	0.2	0.0
04220	12	V	100	30	0	0	2.3	0.3	0.4
04270	00	V	100	29	0	0	2.8	0.1	0.2
04270	12	V	100	30	0	0	2.3	0.3	0.3
04339	00	V	100	27	0	0	6.0	0.4	0.8
04339	12	V	100	25	0	0	3.9	-1.0	1.0
04360	00	V	100	29	0	0	3.1	-1.0	0.4
04360	12	V	100	31	0	0	2.2	0.2	0.3
08001	00	V	100	22	0	0	3.1	0.6	0.4
08001	12	V	100	25	0	0	3.4	-0.1	-0.3
08508	12	V	100	10	0	0	3.7	0.6	0.2
08522	12	V	100	27	0	0	4.6	2.4	0.2
08594	12	V	100	17	0	100	4.8	0.4	-2.2
71600	00	V	100	29	0	0	3.7	0.5	1.2
71600	12	V	100	31	0	0	3.7	-1.6	-0.5
72201	00	V	100	29	0	0	2.9	0.9	-1.0
72201	12	V	100	31	0	0	2.2	0.5	-0.5
72402	00	V	100	26	0	0	3.4	-1.0	-0.4
72402	12	V	100	31	0	0	3.2	0.5	0.1
74494	00	V	100	25	0	100	2.3	-0.2	0.5
74494	12	V	100	28	0	100	2.9	0.0	-0.2
78016	00	V	100	29	0	0	3.7	-0.3	-0.2
78016	12	V	100	31	0	0	3.3	0.7	-0.5

TABLE 13

MONTHLY MONITORING OF RADIOSONDE OBSERVATIONS (COSNA)
MONITORING CENTRE: BRACKNELL
MONTH: July 03

Monitoring procedures

Period		:One calendar month.
Data monitored		:Reports from selected radiosonde TEMPs.
Area monitored		:0°N - 90°N, 100°W - 40°E
Standard of comparison		:Background field from UKMO global model.
Position		:Average latitude and longitude for period.
Observation times		:00, 12 UTC.
Level monitored		:500 hPa.
Element monitored		:VECTOR WIND in $m\ s^{-1}$
Parameters monitored	:NUM OBS	:Number of observations available at level shown during period.
	:NUM GROSS	:Number of gross errors at level shown during period.
	:UBIAS,VBIAS:	Mean difference of observations of U and V components from background values at level shown excluding those with gross errors.
	:RMS	:Root Mean Square difference of observations from background values at level shown excluding those with gross errors.

GROSS ERROR LIMITS :Defined in Appendix I.2

WMO IDENT	OBS TIME	ELM	LEV	NUM OBS	NUM GROSS	% REJ	RMS	UBIAS	VBIAS
DASAP3	12	V	500	7	0	0	2.4	-0.5	-0.5
DBBH	00	V	500	21	0	0	3.3	-0.1	-0.8
DBBH	12	V	500	26	0	0	3.5	-0.8	-1.2
DBLK	12	V	500	15	0	0	2.7	-1.0	0.6
EBUQ	12	V	500	20	0	0	4.9	-1.1	-0.1
ELML7	00	V	500	8	0	0	5.1	-2.7	-0.5
ELML7	12	V	500	9	0	0	4.2	0.9	0.3
FNPH	00	V	500	4	0	0	3.7	0.2	0.3
FNPH	12	V	500	3	0	0	1.7	0.1	-0.6
FNRS	00	V	500	6	0	0	4.2	-0.7	-0.1
FNRS	12	V	500	8	0	0	4.9	-1.8	-0.8
FQFL	00	V	500	5	0	0	2.7	-2.0	0.3
FQFL	12	V	500	5	0	0	3.4	-1.0	-0.4
KHRH	00	V	500	11	0	0	3.3	-0.9	-0.8
KHRH	12	V	500	7	0	0	2.9	-0.8	0.1
LDWR	00	V	500	29	0	0	3.3	-0.1	-0.4
LDWR	12	V	500	30	0	0	2.7	-0.3	-1.4
OXVH2	00	V	500	6	0	0	4.9	-2.5	-1.3
OXVH2	12	V	500	3	0	0	6.1	-2.4	4.0
OXYH2	00	V	500	5	0	0	5.9	-0.3	0.8
OXYH2	12	V	500	3	0	0	11.2	-3.1	5.9
SHIPCK	00	V	500	5	0	0	3.2	-1.3	0.5
SHIPCK	12	V	500	1	0	0	2.7	-1.3	-2.4
V2XM	00	V	500	4	0	0	2.7	-1.3	-0.3
V2XM	12	V	500	4	0	0	3.4	-0.1	-1.8
WPKD	00	V	500	7	0	0	4.2	0.9	-0.3
WPKD	12	V	500	5	0	0	4.7	2.8	-2.2
ZCBP6	00	V	500	4	0	0	4.3	-1.3	0.8
ZCBP6	12	V	500	7	0	0	6.6	2.4	-0.8
03953	00	V	500	29	0	0	4.0	0.2	0.5
03953	12	V	500	31	0	0	3.0	0.8	-0.4
04018	00	V	500	29	0	0	3.4	0.1	-0.7
04018	12	V	500	31	0	0	3.3	0.3	-0.5
04220	00	V	500	28	0	0	3.3	0.6	-0.3
04220	12	V	500	30	0	0	3.1	0.5	0.1
04270	00	V	500	29	0	0	4.7	0.8	0.6
04270	12	V	500	30	0	0	3.9	0.3	-0.1
04339	00	V	500	29	0	0	5.0	-0.2	0.1
04339	12	V	500	30	0	0	3.9	-0.5	0.9
04360	00	V	500	29	0	0	3.8	-0.7	0.3
04360	12	V	500	31	0	0	4.0	-0.6	-0.6
08001	00	V	500	24	0	0	4.2	1.2	0.4
08001	12	V	500	29	0	0	3.3	-0.1	0.3
08508	12	V	500	11	0	0	3.2	0.2	1.0
08522	12	V	500	28	0	0	3.3	0.3	-0.2
08594	12	V	500	23	0	100	4.6	-0.7	-3.2
71600	00	V	500	29	0	0	3.3	1.0	0.3
71600	12	V	500	30	0	0	3.8	1.6	0.1
72201	00	V	500	29	0	0	2.3	0.3	0.3
72201	12	V	500	31	0	0	2.8	0.4	-0.5
72402	00	V	500	27	0	0	2.8	0.5	-0.1
72402	12	V	500	30	0	0	3.0	0.3	-0.1
74494	00	V	500	27	0	100	3.2	-1.6	0.2
74494	12	V	500	30	0	100	3.4	0.1	0.9
78016	00	V	500	29	0	0	3.4	-1.0	0.9
78016	12	V	500	31	0	0	3.2	1.0	-0.7

APPENDIX I

1. The gross error limits for observation minus background differences of geopotential height in Tables 5, 10 and 11 are:-

Level (hPa)	Geopotential height (metres)
1000	100
850	100
700	100
500	150
400	175
300	200
250	225
200	250
150	275
100	300
70	375
50	400
30	450

The weighted RMS values used in Table 5,10 and 11 are calculated using the following weights:-

Level (hPa)	Weight
1000	3.70
850	3.40
700	2.90
500	2.20
400	1.90
300	1.60
250	1.50
200	1.37
150	1.19
100	1.00
70	0.87
50	0.80
30	0.64

2. The gross error limits for observation minus background differences of windspeed in Tables 6,12 and 13 are:-

Level (hPa)	Windspeed m s^{-1}
1000	35
850	35
700	40
500	45
400	50
300	60
250	60
200	50
150	50
100	45